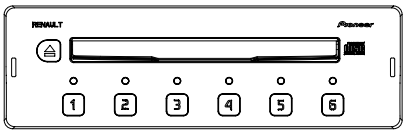
Service Manual

Pioneer

RENAULT



ORDER NO.
CRT2412

6 DISC IN-DASH CD CHANGER

CDX-MG2006ZRN EW

● This service manual should be used together with the following manual(s):

Model No.	Order No.	Mech. Module	Remarks
CX-890	CRT2376	G1	CD Mechanism Module:Circuit Description, Mechanism Description, Disassembly

VEHICLE	DESTINATION	PRODUCED AFTER	RENAULT PART No.	ID No.	PIONEER MODEL No.
ESPACE, AVANTIME	EUROPE	April 2000	6025 40 2760	——	CDX-MG2006ZRN/EW

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K-ZZB. FEB. 2000 Printed in Japan

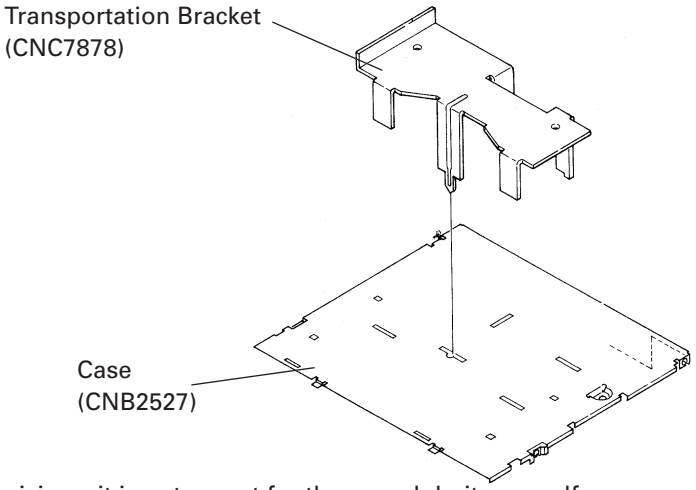
● CD Player Service Precautions

1. For pickup unit(CXX1311) handling, please refer to"Disassembly"(see page 54).
   During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.
3. Please checking the grating after changing the service pickup unit(see page 46).

● When the Repair is Complete

When the repair is complete, make the CD mechanism ready for transportation implementing the following procedures:

1. Press the changer side 1 and 4 simultaneously to turn the ACC on.
2. As the ACC is turned on, the disc indicator blinks in red.
3. When the blinking is stopped, the mechanism is ready for the transportation.
4. Attach the Transportation Bracket (CNC7878). Now you can transport it.(See the figure below)



1. SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty.
If you are not qualified to perform the repair of this product properly and safely; you should not risk trying to do so and refer the repair to a qualified service technician.

1. Safety Precautions for those who Service this Unit.

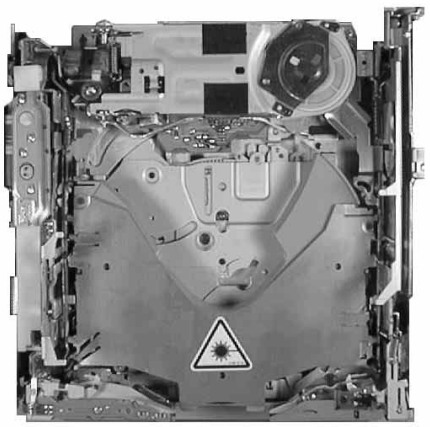
- **When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.**

Caution:

1. During repair or tests, minimum distance of 13cm from the focus lens must be kept.
2. During repair or tests, do not view laser beam for 10 seconds or longer.

2. A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player.

3. The triangular label is attached to the mechanism unit holder.

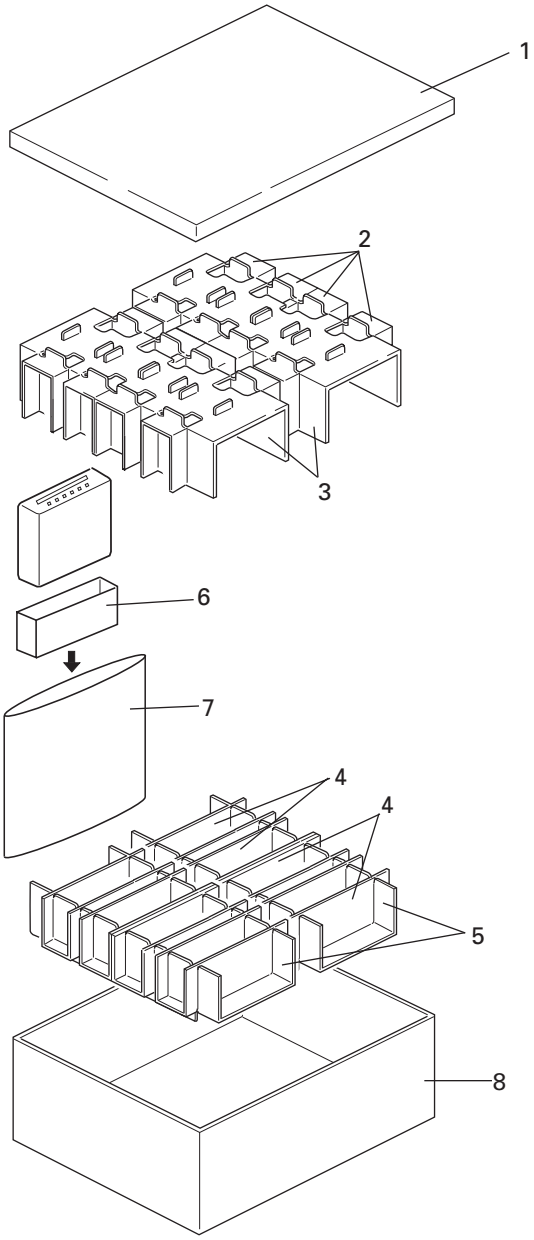


4. Specifications of Laser Diode

Specifications of laser radiation fields to which human access is possible during service.
Wavelength = 800 nanometers

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING



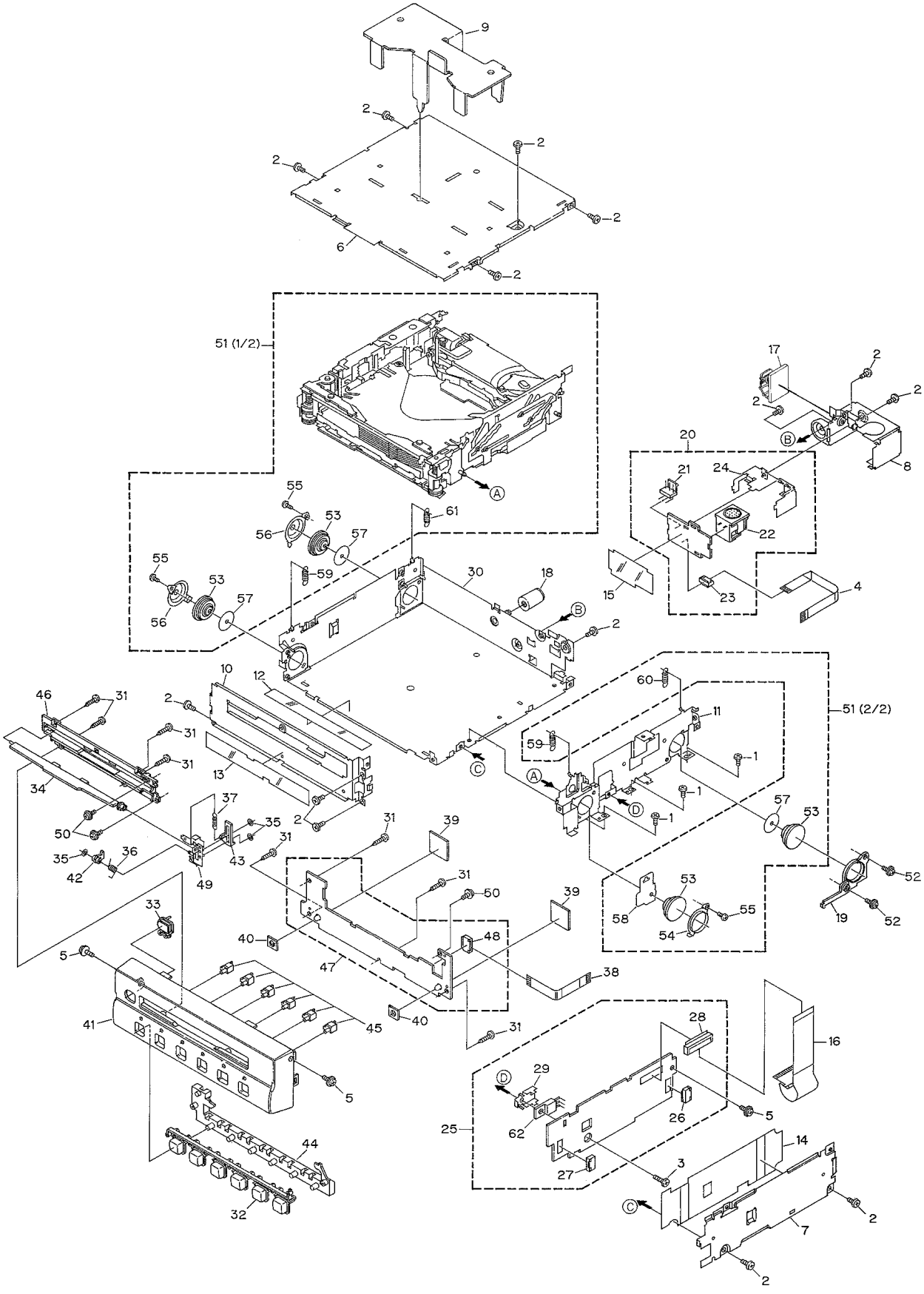
NOTE:

- Parts marked by "*" are generally unavailable because they are not in our Master Spare Parts List.
- Screws adjacent to ∇ mark on the product are used for disassembly.

● PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Lid	CHW1584
*	2	Protector	CHP2235
*	3	Protector	CHP2234
*	4	Protector	CHP2237
*	5	Protector	CHP2236
*	6	Protector	CHP2238
	7	Polyethylene Bag	CEG1042
*	8	Contain Box	CHL3990

2.2 EXTERIOR

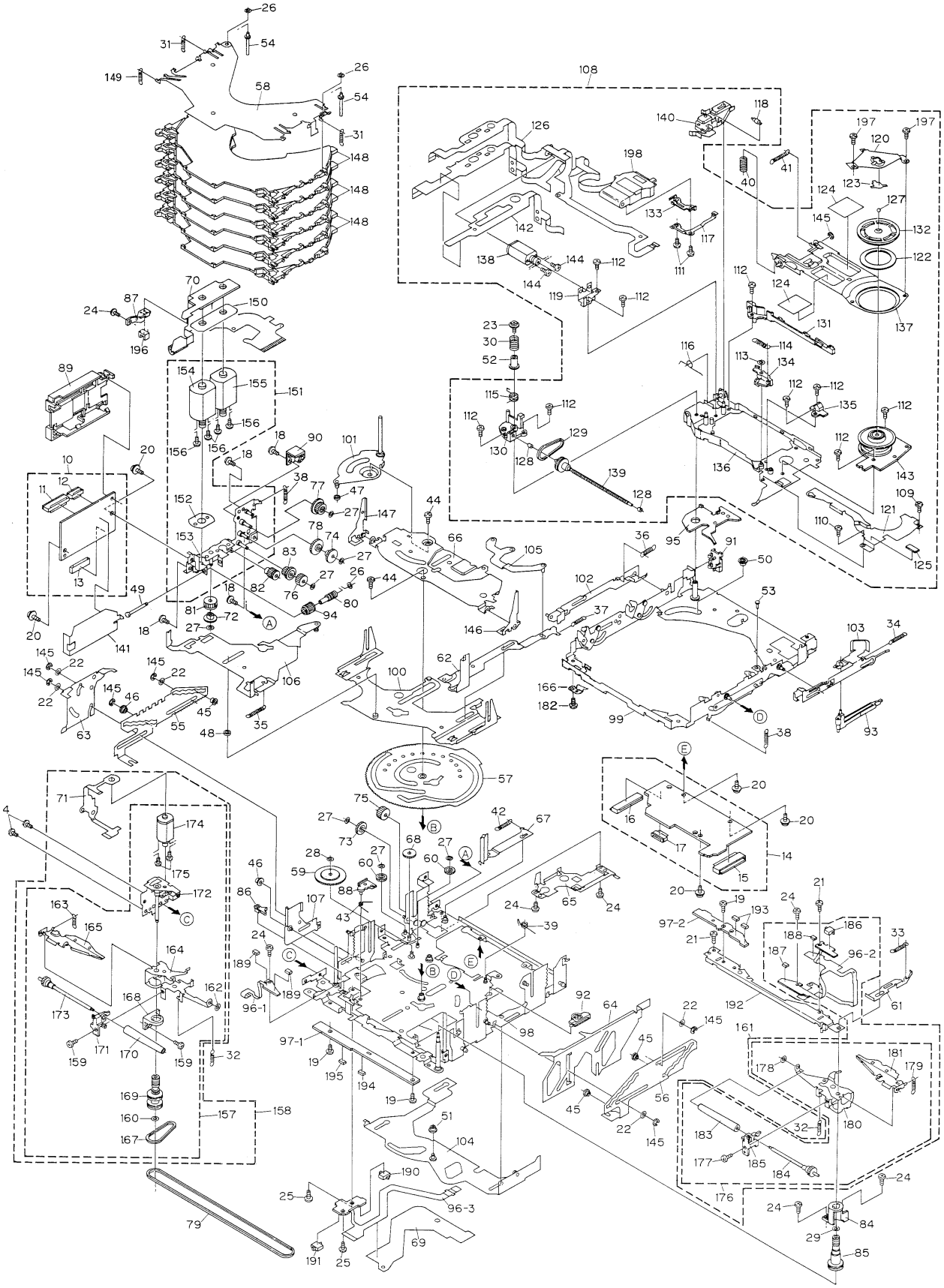

9
2
6
51 (1/2)
A
17
B
8
20
21
24
22
15
23
4
55
53
56
57
59
61
30
18
10
12
46
31
34
13
37
35
50
42
36
43
49
60
11
51 (2/2)
C
D
58
54
52
19
39
47
48
38
40
33
5
41
45
44
32
28
29
62
26
25
16
14
27
3
7

● EXTERIOR SECTION PARTS LIST

Mark No.	Description	Part No.
1	Screw	BMZ20P020FMC
2	Screw	BMZ26P030FMC
3	Screw	BMZ26P060FMC
4	Connector	CDE6144
5	Screw	IMS26P040FMC
6	Case	CNB2527
7	Side Frame	CNB2528
8	Case	CNB2529
9	Bracket	CNC7878
10	Front frame	CNC8574
11	Bracket	CNC8816
12	Insulator	CNM5969
13	Insulator	CNM6248
14	Insulator	CNM6532
15	Insulator	CNM6533
16	PCB	CNP5516
17	Clamper	CNV5150
18	Bush	CNV3253
19	Holder	CNV5543
20	Connector Unit	CWM6823
21	Plug(CN705)	CKS2372
22	Connector(CN704)	CKS3180
23	Connector(CN703)	CKS4120
24	Holder	CNC8575
25	Extension Unit	CWM6824
26	Connector(CN777)	CKS3747
27	Connector(CN701)	CKS3747
28	Connector(CN101)	CKS3989
29	Holder	CNC8031
30	Chassis Unit	CXB4792
31	Screw	BPZ20P080FMC
32	Button(1-6)	CAC6344
33	Button(EJECT)	CAC6345
34	Door	CAT2185
35	Washer	CBF1038
36	Spring	CBH2200
37	Spring	CBH2201
38	Connector	CDE6143
39	Insulator	CNM5331
40	Insulator	CNM6818
41	Grille	CNS6101
42	Gear	CNV5547
43	Arm	CNV5548
44	Lighting Conductor	CNV6028
45	Lighting Conductor	CNV6029

Mark No.	Description	Part No.
46	Holder	CNV6030
47	Keyboard Unit	CWM6822
48	Connector(CN901)	CKS3748
49	Bracket Unit	CXB3111
50	Screw	IMS20P040FMC
51	CD Mechanism Module(G1)	CXK4700
52	Screw	IMS20P040FMC
53	Damper	CNV5120
54	Holder	CNC7826
55	Screw(M2x2)	CBA1250
56	Holder	CNC7477
57	Sheet	CNM5981
58	Sheet	CNM6318
59	Spring(Front)	CBH2409
60	Spring(Right Rear)(Black)	CBH2361
61	Spring(Left Rear)	CBH2365
62	Transistor(Q708)	2SB1335A

2.3 CD MECHANISM



● CD MECHANISM SECTION PARTS LIST

Mark	No.	Description	Part No.
	1-9	•••••	
	10	CD Core Unit(Servo Unit)	CWX2202
	11	Connector(CN101)	CKS2764
	12	Connector(CN301)	CKS3966
	13	Connector(CN201)	CKS3991
	14	CD Core Unit(STS Unit)	CWX2203
	15	Connector(CN701)	CKS3989
	16	Connector(CN801)	CKS3989
	17	Connector(CN802)	CKS4054
	18	Screw	CBA1037
	19	Screw	CBA1041
	20	Screw	CBA1076
	21	Screw	CBA1250
	22	Washer	CBA1512
	23	Screw	CBA1452
	24	Screw	CBA1453
	25	Screw	CBA1479
	26	Washer	CBF1037
	27	Washer	CBF1038
	28	Washer	CBF1039
	29	Washer	CBF1064
	30	Spring	CBH2007
	31	Spring	CBH2271
	32	Spring	CBH2274
	33	Spring	CBH2014
	34	Spring	CBH2015
	35	Spring	CBH2016
	36	Spring	CBH2017
	37	Spring	CBH2290
	38	Spring	CBH2366
	39	Spring	CBH2064
	40	Spring	CBH2195
	41	Spring	CBH2196
	42	Spring	CBH2224
	43	Spring	CBH2250
	44	Screw	CBA1082
	45	Roller	CLA3154
	46	Roller	CLA3157
	47	Roller	CLA3159
	48	Roller	CLA3160
	49	Shaft	CLA3179
	50	Spacer	CLA3194
	51	Roller	CLA3248
	52	Bush	CLA3353
*	53	Shaft	CLA3469
	54	Shaft	CLA3693
	55	Steer	CNC7215
	56	Steer	CNC7216
	57	Cam	CNC8774
*	58	Holder	CNC7235
	59	Gear	CNC7236
	60	Gear	CNC8883
	61	Lever	CNC7243
	62	Lever	CNC7244
	63	Lever	CNC7245
	64	Lever	CNC7246
	65	Cover	CNC7441
	66	Holder Unit	CXB4946
	67	Lever	CNC8024
	68	Gear	CNC8140
	69	Sheet	CNM5831
	70	PCB	CNP5680
	71	PCB	CNP5681
	72	Gear	CNR1479
	73	Gear	CNR1481
	74	Gear	CNR1495
	75	Gear	CNR1501
	76	Gear	CNR1502
	77	Gear	CNR1540
	78	Gear	CNR1541
	79	Belt	CNT1080
	80	Worm Gear	CNV5046
	81	Gear	CNV5047
	82	Gear	CNV5048
	83	Gear	CNV5049
	84	Holder	CNV5056
	85	Pulley	CNV5058
	86	Arm	CNV5061
	87	Spacer	CNV5066
	88	Arm	CNV5189
	89	Cover	CNV5207
	90	Cover	CNV5424
	91	Cover	CNV5425
	92	Lever	CNV5427
	93	Arm	CNV5491
	94	Gear	CNV5519
	95	Holder	CNV5648
	96	Composite PCB	CNX3141
	97	Composite PCB	CNX2989
	98	Chassis Unit	CXB4314

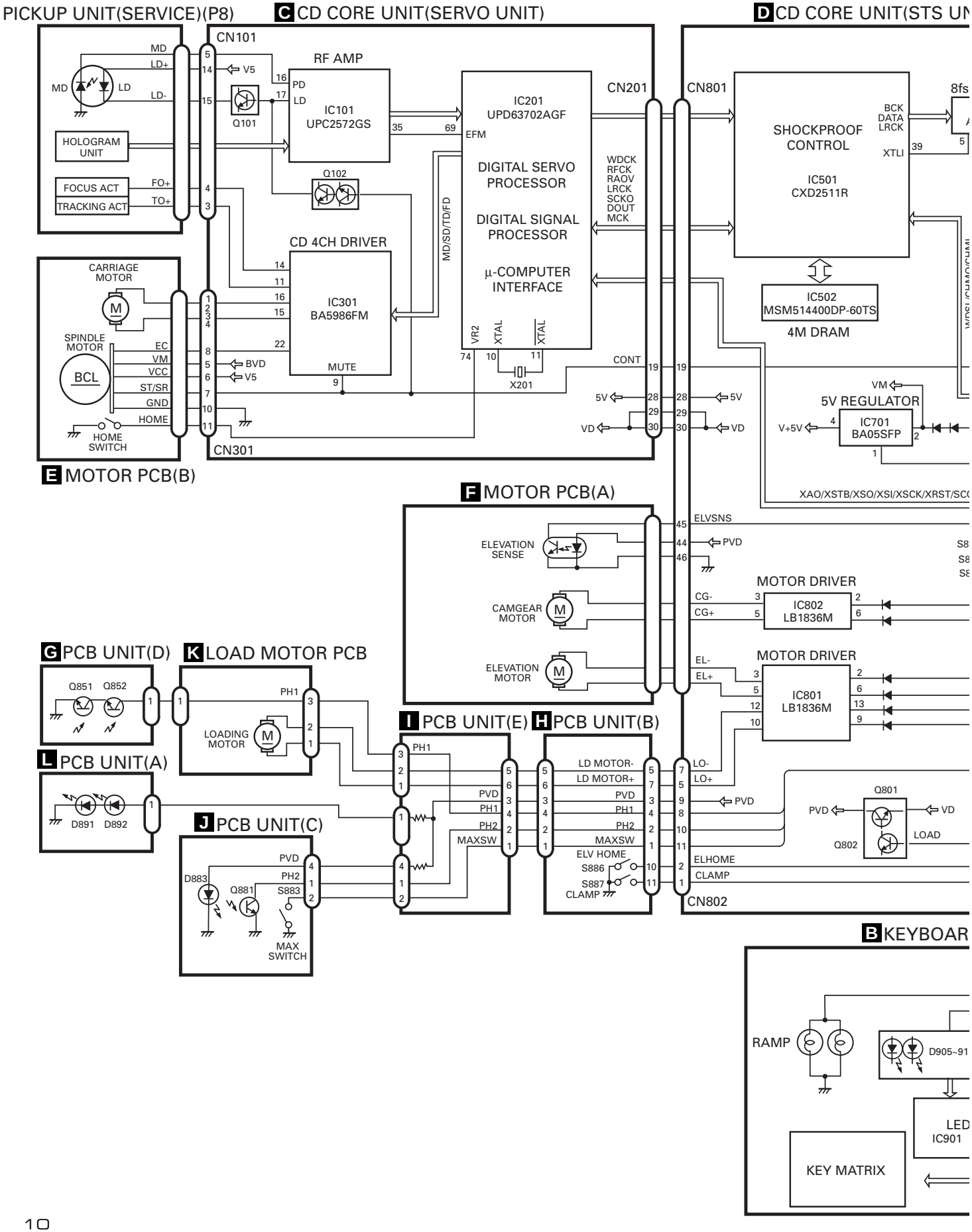
Mark	No.	Description	Part No.
	99	Frame Unit	CXB5806
	100	Lever Unit	CXB6026
	101	Arm Unit	CXB2704
	102	Lever Unit	CXB2708
	103	Lever Unit	CXB2709
	104	Lever Unit	CXB2711
	105	Arm Unit	CXB2712
	106	Lever Unit	CXB6027
	107	Lever Unit	CXB2714
	108	Carriage Mechanism Unit(G1)	CXB2998
	109	Screw	CBA1041
	110	Screw	CBA1250
	111	Screw	CBA1362
	112	Screw	CBA1471
	113	Washer	CBF1038
	114	Spring	CBH2008
	115	Spring	CBH2009
	116	Spring	CBH2010
	117	Spring	CBL1335
	118	Roller	CLA3707
*	119	Bracket	CNC7228
	120	Guide Unit	CXB4417
	121	Cover	CNC7628
	122	Sheet	CNM6414
	123	Sheet	CNM5378
	124	Sheet	CNM5695
	125	Sheet	CNM5827
	126	PCB	CNP4978
	127	Ball	CNR1189
	128	Bearing	CNR1423
	129	Belt	CNT1079
	130	Holder	CNV5037
	131	Guide	CNV5040
	132	Clamper	CNV5042
	133	Rack	CNV5111
	134	Arm	CNV5579
	135	Holder	CNV5759
*	136	Chassis	CXB6025
	137	Arm Unit	CXB2705
	138	Motor Unit(M4 CARRIAGE)	CXB3178
	139	Screw Unit	CXB3179
	140	Lever Unit	CXB4450
	141	Insulator	CNM6306
	142	Spacer	CNM6345
	143	Motor(M5 SPINDLE)	CXM1120

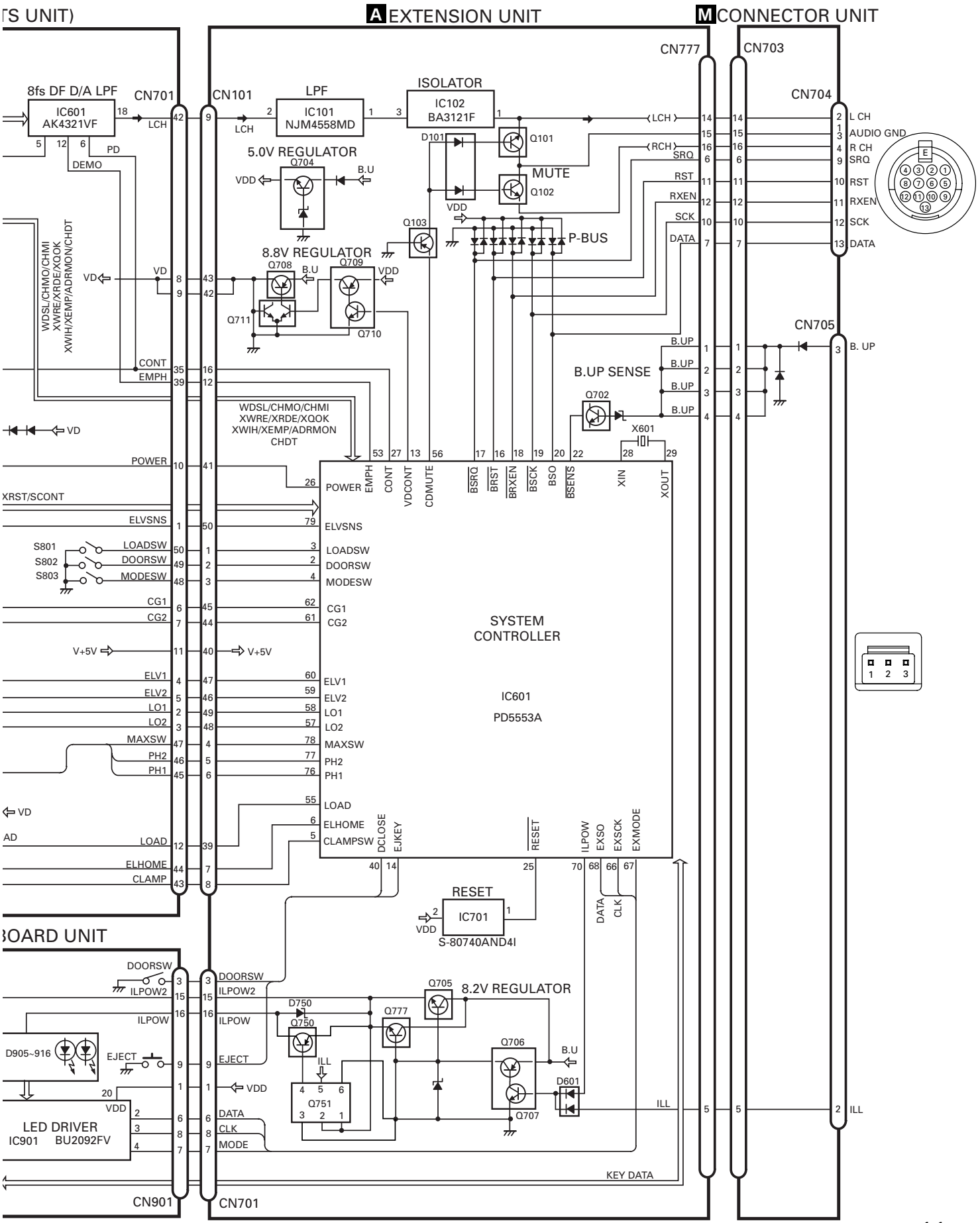
Mark	No.	Description	Part No.
	144	Screw	JFZ14P020FZK
	145	Washer	YE15FUC
	146	Arm Unit	CXB5018
	147	Arm Unit	CXB5019
	148	Tray Assy	CXB4307
	149	Spring	CBH2269
	150	Sheet	CNM6699
	151	Cam Motor Assy	CXB3170
	152	Spacer	CNC8289
*	153	Bracket Unit	CXB4165
*	154	Motor Unit(M1 Cam Gear)	CXB3174
*	155	Motor Unit(M3 ELV)	CXB3175
	156	Screw	JFZ20P025FMC
	157	Loading Arm L Assy	CXB3171
	158	Load Arm L Assy(Service)	CXX1415
	159	Screw	CBA1453
	160	Washer	CBF1038
	161	Load Arm R Assy(Service)	CXX1416
	162	Washer	CBF1074
	163	Spring	CBH2136
*	164	Arm	CNC7241
*	165	Arm	CXB4449
	166	Holder	CBL1465
	167	Belt	CNT1079
	168	Holder	CNV5055
	169	Pulley	CNV5057
	170	Roller	CNV6209
	171	Guide	CNV5125
*	172	Bracket Unit	CXB4316
	173	Roller Gear Unit	CXB3176
*	174	Motor Unit(M2 LOAD)	CXB3177
	175	Screw	JFZ14P020FMC
	176	Loading Arm R Assy	CXB3172
	177	Screw	CBA1453
	178	Washer	CBF1074
	179	Spring	CBH2136
*	180	Arm	CNC7242
*	181	Arm	CXB4448
	182	Screw	JFZ20P014FMC
	183	Roller	CNV6209
	184	Roller Gear Unit	CXB3176
	185	Guide	CNV5126
	186	Switch(S885 MAX)	CSN1052
	187	LED(D883)	CL202IRXTU
	188	Photo-transistor(Q881)	CPT231SXTD

Mark	No.	Description	Part No.
	189	LED(D891,892)	CL202IRXTU
	190	Switch(S887 CLAMP)	CSN1051
	191	Switch(S886 ELV HOME)	CSN1052
	192	Bracket Unit	CXB4306
	193	Photo-transistor(Q851,852)	CPT231SXTD
	194	Resistor(R856)	RS1/8S911J
	195	Resistor(R857)	RS1/8S821J
	196	Photo-interrupter(Q1)	RPI-221
	197	Screw	CBA1387
	198	Pickup Unit(Service)(P8)	CXX1311

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

3.1 BLOCK DIAGRAM

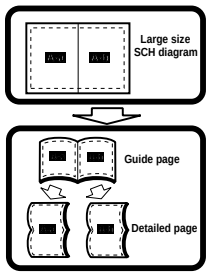


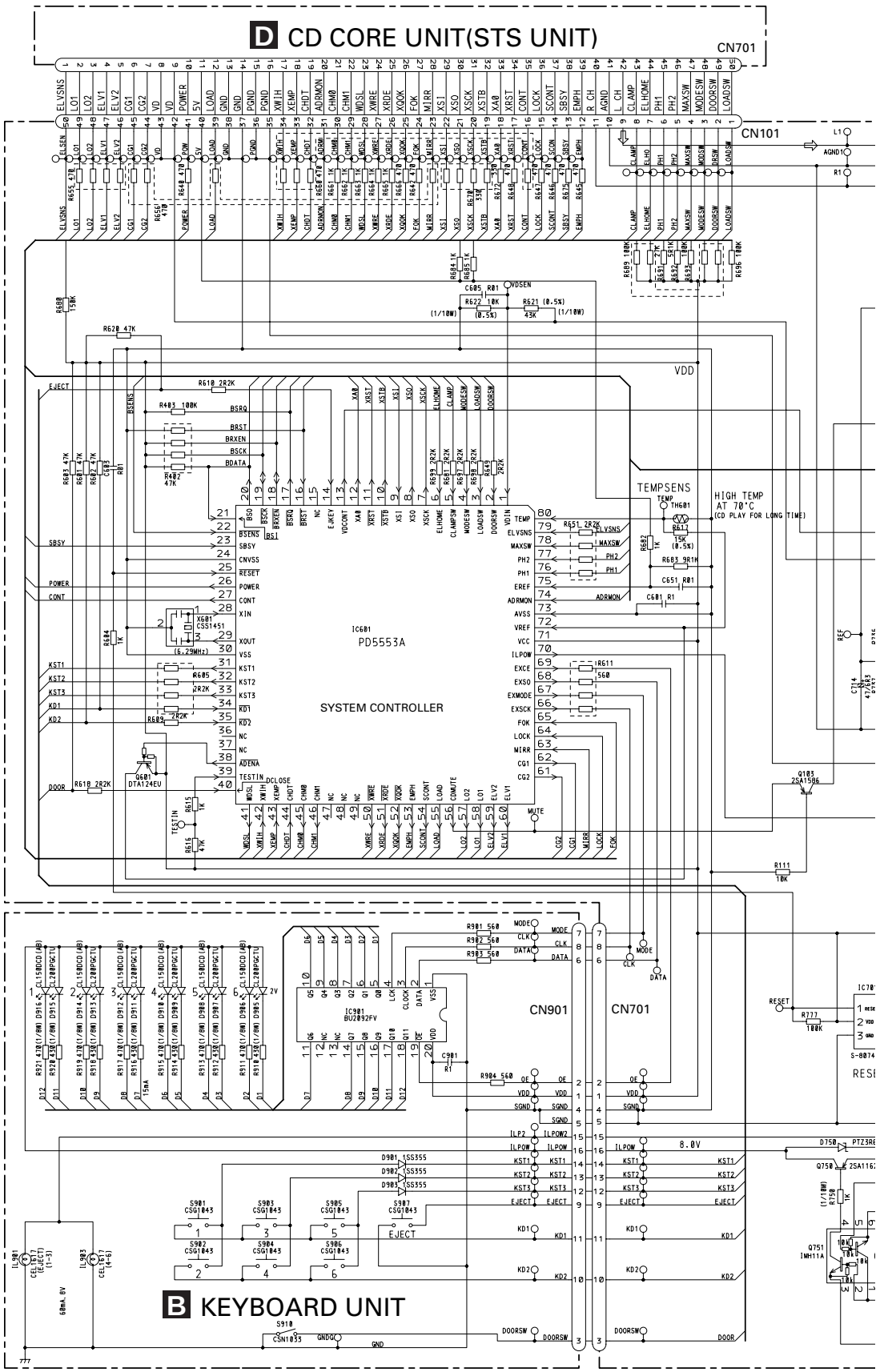

TS UNIT)
A EXTENSION UNIT
M CONNECTOR UNIT
CN777
CN703
CN704
CN705
8fs DF D/A LPF
IC601
AK4321VF
CN701
CN101
LPF
IC101
NJM4558MD
ISOLATOR
IC102
BA3121F
LCH
RCH
SRQ
RST
RXEN
SCK
DATA
L CH
AUDIO GND
R CH
SRQ
RST
RXEN
SCK
DATA
5.0V REGULATOR
Q704
VDD
B.U
MUTE
Q101
Q102
D101
Q103
P-BUS
8.8V REGULATOR
Q708
Q709
Q711
Q710
VD
PD
DEMO
CONT
EMPH
WDSL/CHMO/CHMI
XWRE/XRDE/XQOK
XWIH/XEMP/ADRMON/CHDT
B.UP
B.UP SENSE
Q702
X601
POWER
XRST/SCONT
ELVSNS
S801
S802
S803
LOADSW
DOORSW
MODESW
CG1
CG2
V+5V
ELV1
ELV2
LO1
LO2
MAXSW
PH2
PH1
LOAD
ELHOME
CLAMP
SYSTEM
CONTROLLER
IC601
PD5553A
EMPH
CONT
VDCONT
CDMUTE
BSRQ
BRST
BRXEN
BSCK
BSO
BSENS
XIN
XOUT
RESET
ILPOW
EXSO
EXSCK
EXMODE
DCLOSE
EJKEY
IC701
S-80740AND4I
DATA
CLK
BOARD UNIT
DOORSW
ILPOW2
ILPOW
EJECT
D905~916
LED DRIVER
IC901 BU2092FV
MODE
KEY DATA
8.2V REGULATOR
Q705
Q706
Q707
Q750
Q751
Q777
D750
D601
ILL
CN901
CN701

3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

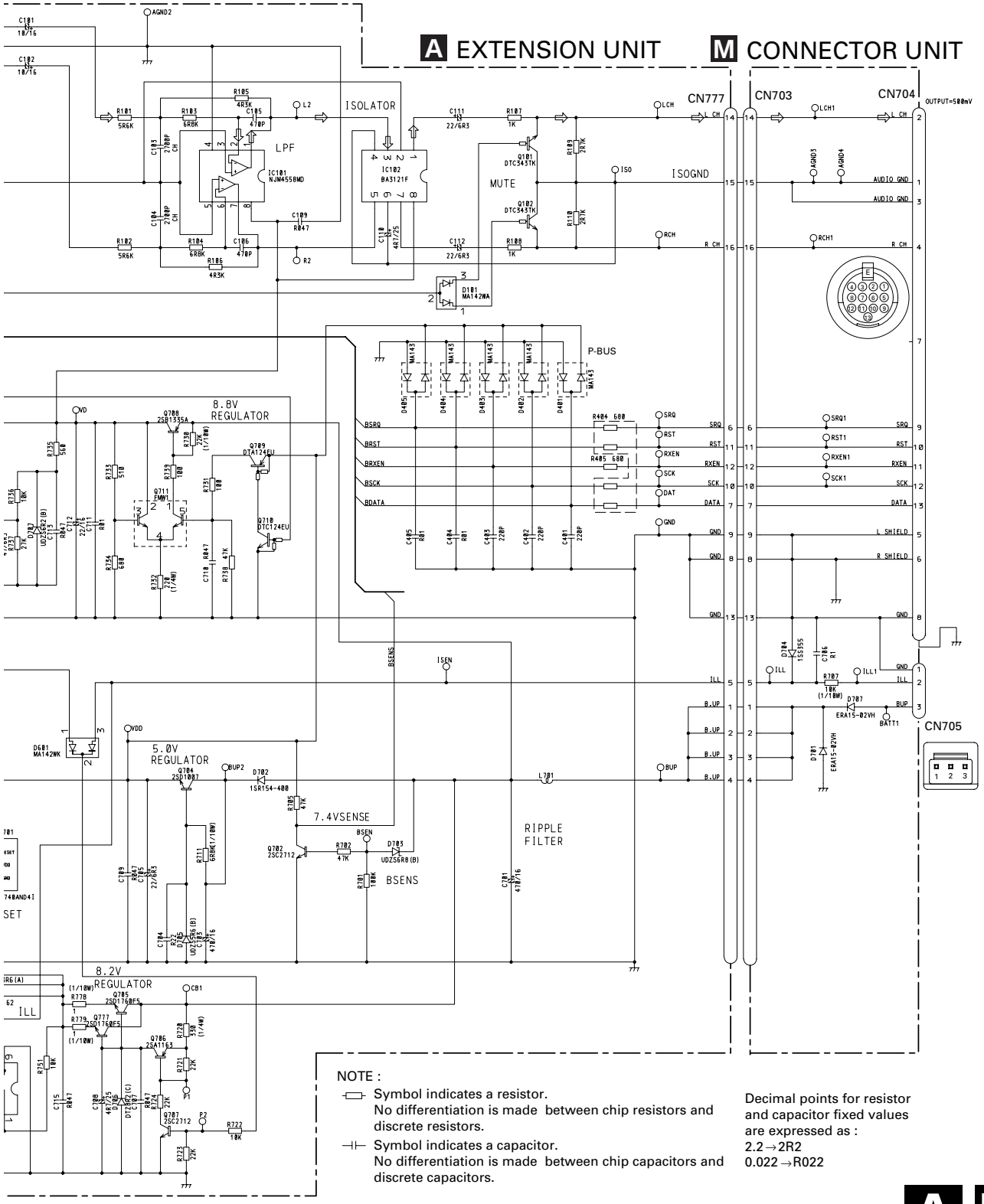
Note: When ordering service parts, be sure to refer to "EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".

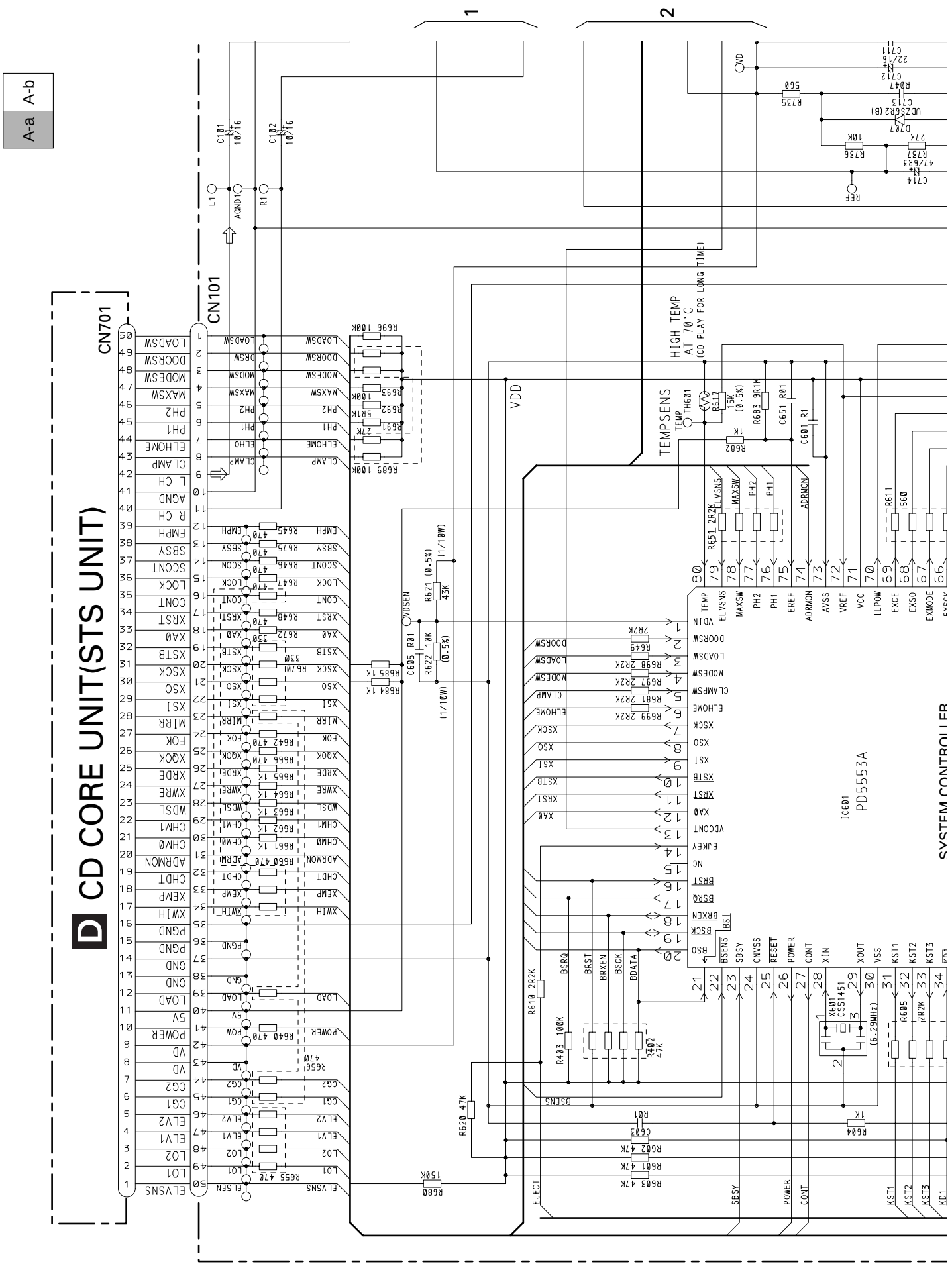
A-a

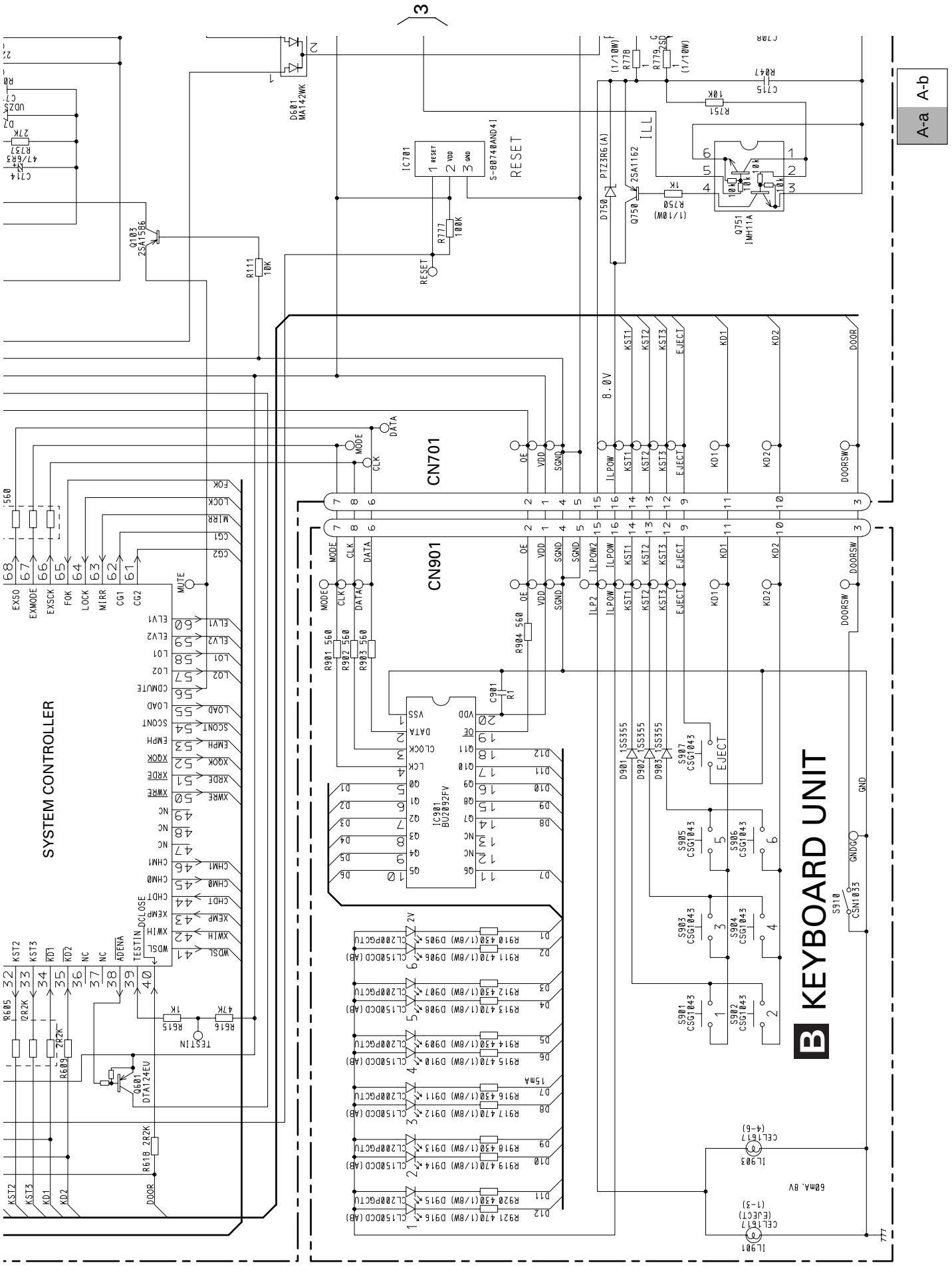




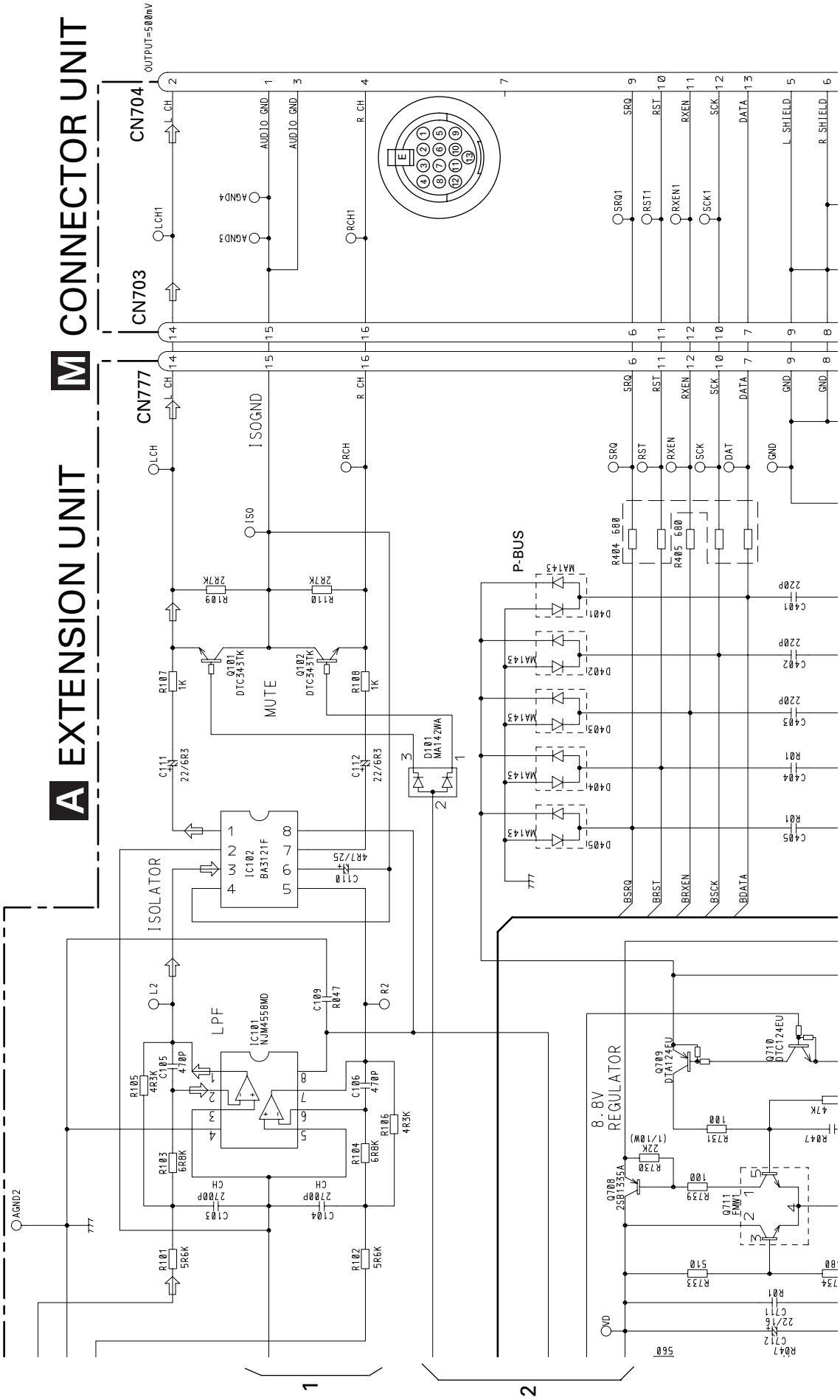
A-b

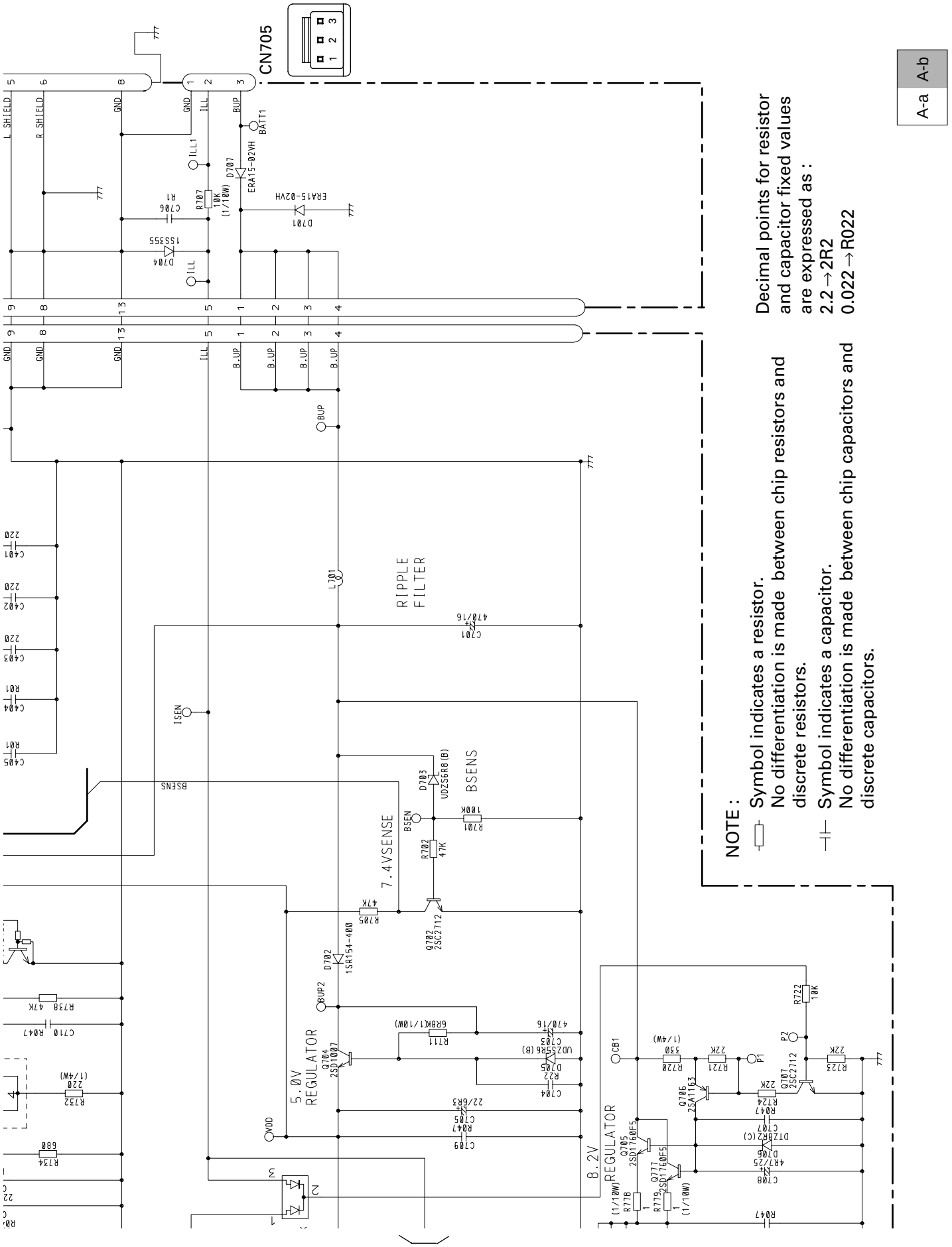

A EXTENSION UNIT
M CONNECTOR UNIT
CN777
CN703
CN704
CN705
OUTPUT=500mV
ISOLATOR
LPF
MUTE
P-BUS
8.8V REGULATOR
5.0V REGULATOR
8.2V REGULATOR
7.4VSENSE
RIPPLE FILTER
BSENS
ISEN
ISOGND
AUDIO GND
L CH
R CH
L SHIELD
R SHIELD
SRQ
RST
RXEN
SCK
DAT
DATA
GND
ILL
B.UP
BUP
BATT1
NOTE :
Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.
Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.
Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022


D CD CORE UNIT(STS UNIT)
CN101
CN701
SYSTEM CONTROLLER
IC601
PD5553A
HIGH TEMP
AT 70°C
(CD PLAY FOR LONG TIME)
TEMPSENS
VDD
EJECT
SBSY
POWER
CONT
KST1
KST2
KST3
KD1

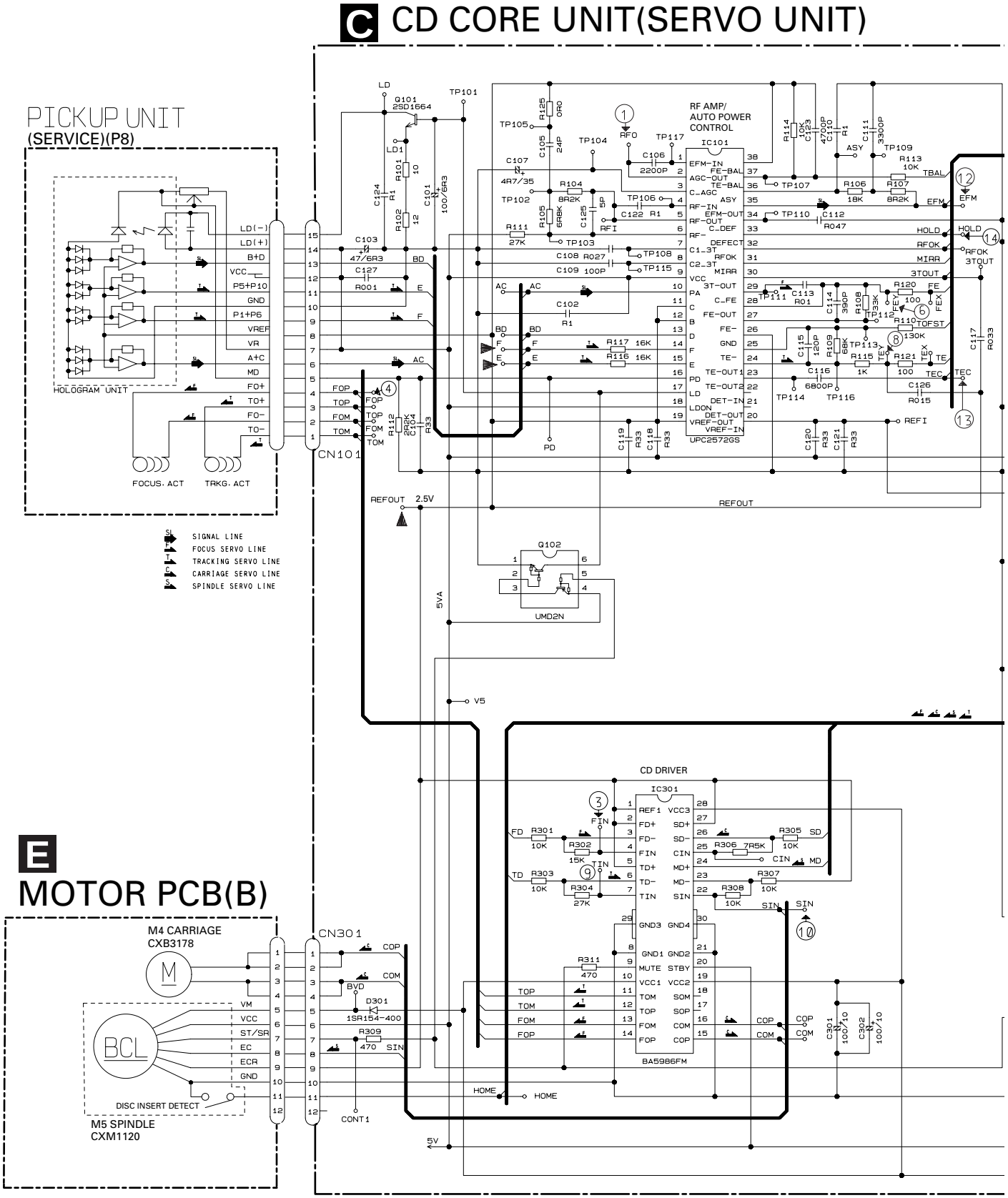

SYSTEM CONTROLLER
B KEYBOARD UNIT
CN701
CN901
IC701
S-80740AND-41
IC901
BU2092FV
RESET
EJECT
8.0V
60mA, 8V
A-a
A-b
B

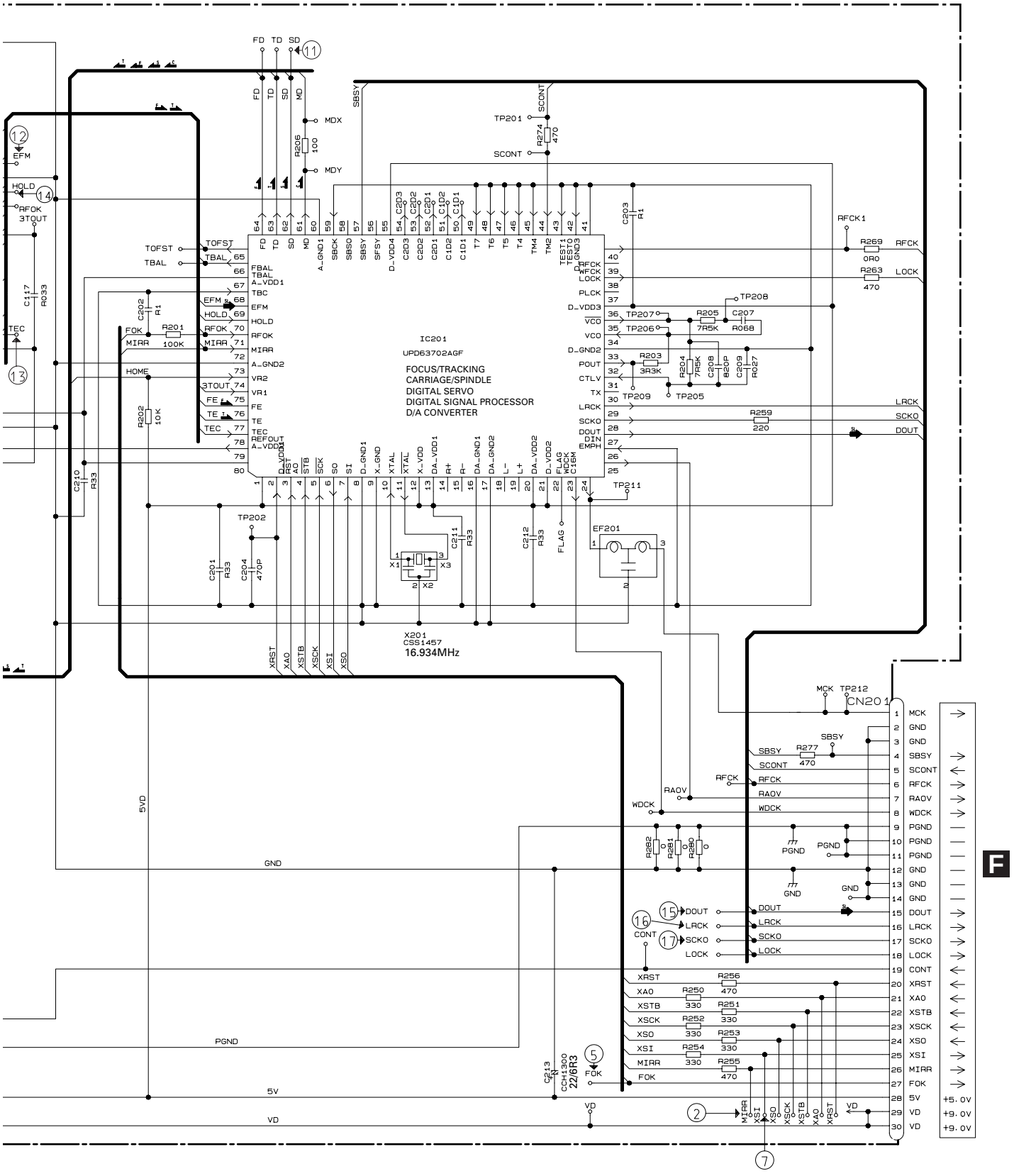
A-a A-b


A EXTENSION UNIT M CONNECTOR UNIT
CN704
CN703
CN777
OUTPUT=500mV
L CH
R CH
AUDIO GND
AGND4
AGND3
LCH1
RCH1
SRQ1
RST1
RXEN1
SCK1
SRQ
RST
RXEN
SCK
DATA
L SHIELD
R SHIELD
GND
DAT
LCH
RCH
ISO
ISOGND
MUTE
Q101 DTC343TK
Q102 DTC343TK
R107 1K
R108 1K
R109 2R7K
R110 2R7K
C111 22/6R3
C112 22/6R3
D101 MA142WA
IC102 BA3121F
C110 4R7/25
ISOLATOR
P-BUS
MA143
R404 680
R405 680
C401 220P
C402 220P
C403 220P
C404 R01
C405 R01
BSRQ
BRST
BRXEN
BSCK
BDATA
L2
R2
LPF
IC101 NJM4558MD
C109 R047
R105 4R3K
C105 470P
C106 470P
R106 4R3K
R103 6R8K
R104 6R8K
C103 2700P CH
C104 2700P CH
AGND2
R101 5R6K
R102 5R6K
8.8V REGULATOR
Q709 DTA124EU
Q710 DTC124EU
Q708 2SB1132SA
Q711 FMW1
R730 22K (1/10W)
R731 100
R739 100
R733 510
R734 560
R047 4.7K
C711 22/16
C712 R047
VD
1
2


CN705
L SHIELD
R SHIELD
GND
ILL
B.UP
BATT1
ILL1
D707
ERA15-02VH
R707
1.8K
(1/10W)
C706
R1
D704
1SS355
D701
ERA15-02VH
BUP
L701
RIPPLE
FILTER
C701
470/16
ISEN
BSENS
D703
UDZS6R8(B)
R701
100K
BSEN
R702
47K
7.4VSENSE
R705
47K
Q702
2SC2712
D702
1SR154-400
BUP2
5.0V
REGULATOR
Q704
2SD1007
R711
6R8K(1/10W)
C703
470/16
UDZS5R6(B)
D705
R22
C704
22/6R3
C705
R047
C709
VDD
CB1
R720
330
(1/4W)
R721
22K
P1
R722
10K
P2
R723
22K
Q706
2SA1163
R724
22K
R047
Q707
2SC2712
8.2V
REGULATOR
Q705
2SD1760F5
Q777
2SD1760F5
D708
4R7/25
C708
D707
DTZ8R2(C)
R779
1
(1/10W)
R778
1
(1/10W)
R047
R738
47K
C710
R047
R732
220
(1/4W)
R734
680
C401
220
C402
220
C403
220
C404
R01
C405
R01
R01
3
NOTE :
Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.
Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.
Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022
A-a
A-b

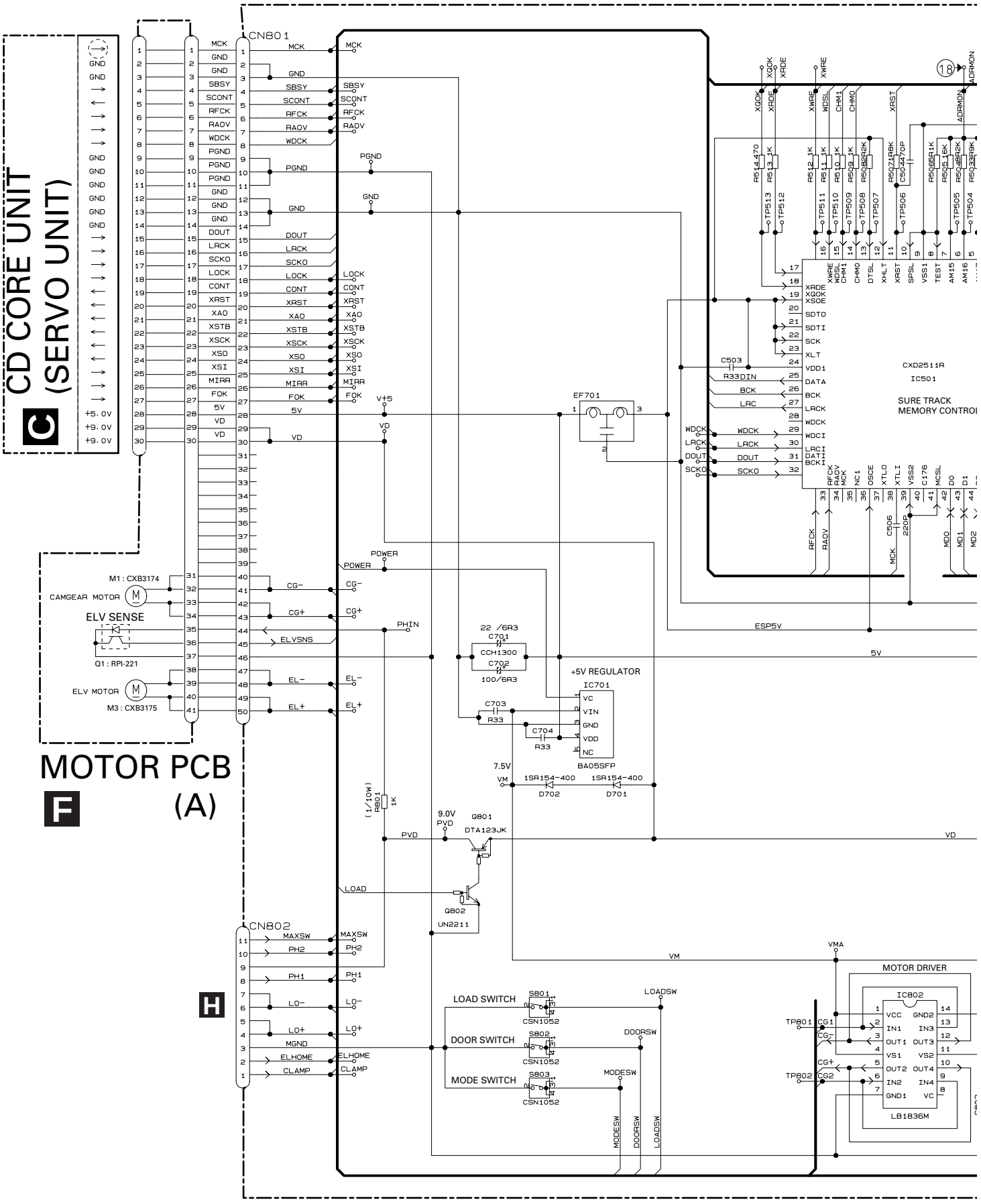
3.3 CD CORE UNIT(SERVO UNIT)

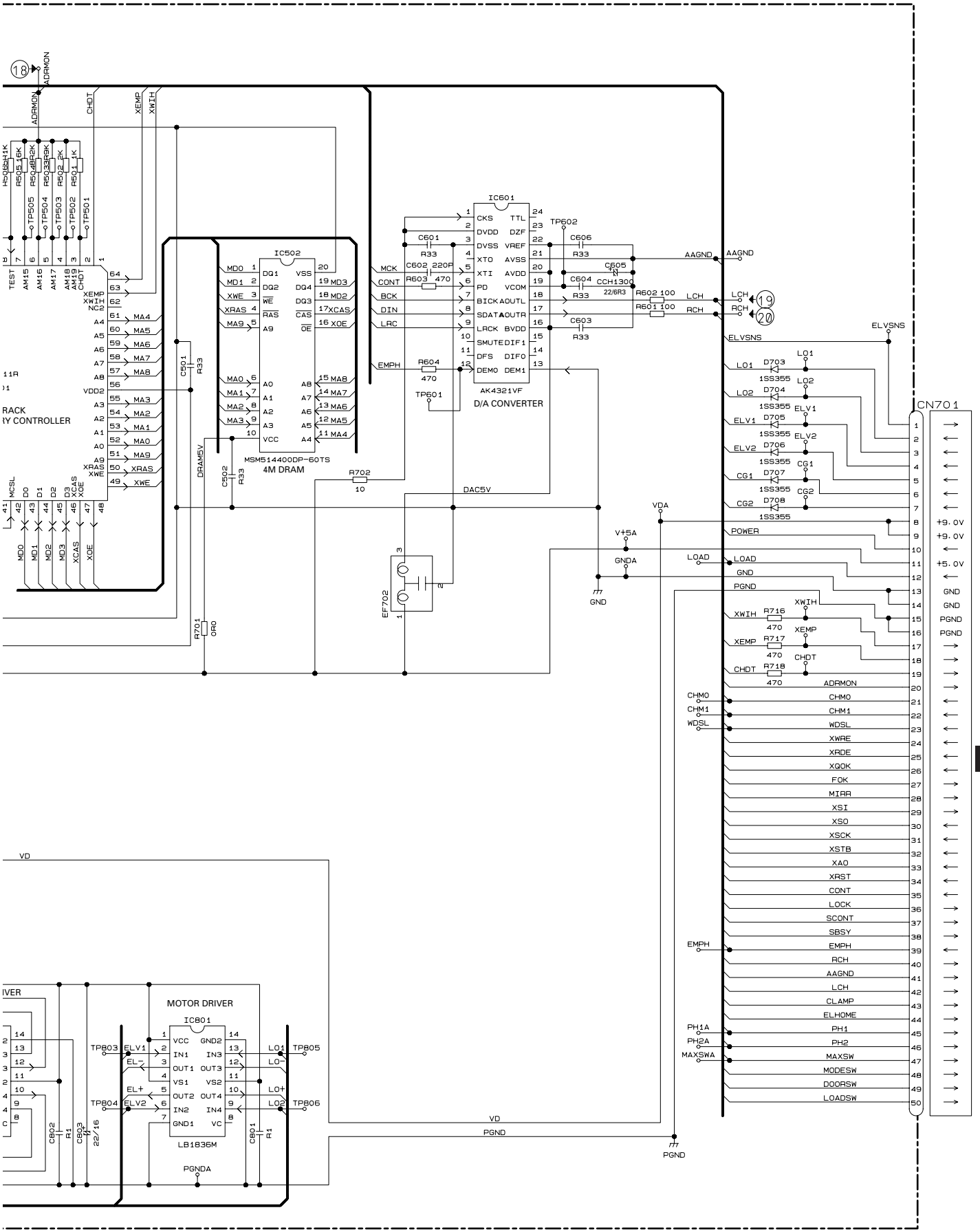



IC201
UPD63702AGF
FOCUS/TRACKING
CARRIAGE/SPINDLE
DIGITAL SERVO
DIGITAL SIGNAL PROCESSOR
D/A CONVERTER
X201
CSS1457
16.934MHz
CN201
TP201
TP202
TP205
TP206
TP207
TP208
TP209
TP211
TP212
EF201
MDX
MDY
SCONT
RFCK
LOCK
DOUT
LRCK
SCKO
WDCK
RAOV
MCK
SBSY
XRST
XAO
XSTB
XSCK
XSI
XSO
MIRR
FOK
TOFST
TBAL
FBAL
TBC
EFM
HOLD
RFOK
MIRR
A_GND2
VR2
VR1
FE
TE
TEC
REFOUT
A_VDD1
HOME
3TOUT
PLCK
D_VDD3
VCO
D_GND2
POUT
CTLV
TX
DIN
EMPH
5VD
GND
PGND
5V
VD
+5.0V
+9.0V

3.4 CD CORE UNIT(STS UNIT)

D CD CORE UNIT(STS UNIT)

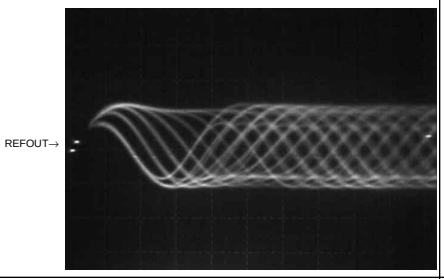



IC601
AK4321VF
D/A CONVERTER
IC502
MSM514400DP-60TS
4M DRAM
MOTOR DRIVER
IC801
LB1836M
CN701
CN101
ADRMON
CHDT
XEMP
XWIH
AAGND
LCH
RCH
ELVSNS
POWER
LOAD
GND
PGND
VDA
V+5A
GNDA
DAC5V
DRAM5V
VD
PGND
CHM0
CHM1
WDSL
XWRE
XRDE
XQOK
FOK
MIRR
XSI
XSO
XSCK
XSTB
XAO
XRST
CONT
LOCK
SCONT
SBSY
EMPH
CLAMP
ELHOME
PH1A
PH2A
MAXSWA
PH1
PH2
MAXSW
MODESW
DOORSW
LOADSW

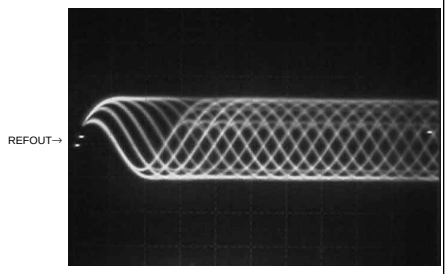
Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFOUT:2.5V

● Waveforms

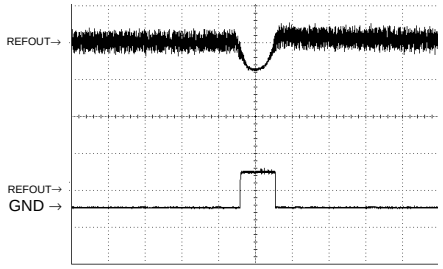
① RFO 0.5V/div. 0.2µs/div.
Normal mode: play



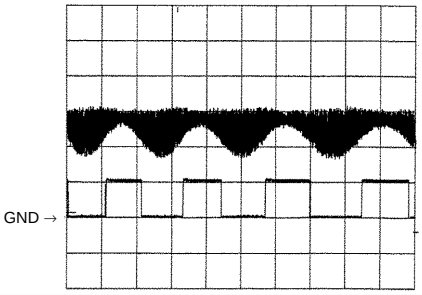
① RFO 0.5V/div. 0.5µs/div.
Test mode



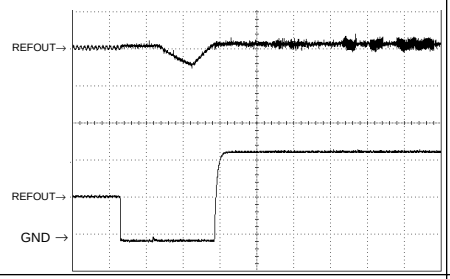
① CH1: RFO 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Normal mode: The defect part passes 500µs/div.



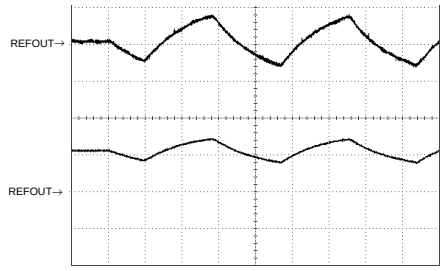
① CH1: RFO 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Test mode: Tracking open



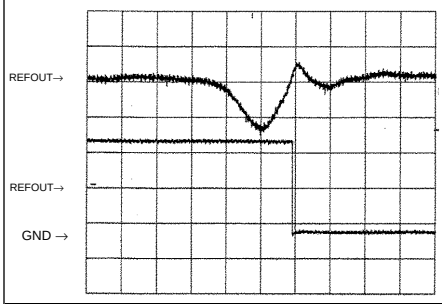
③ CH1: FIN 0.5V/div. 0.2s/div.
⑤ CH2: FOK 2V/div.
Normal mode: Focus close



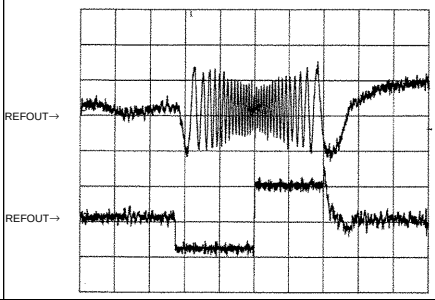
③ CH1: FIN 0.5V/div. 0.2s/div.
④ CH2: FOP 2V/div.
Test mode: No disc, Focus close



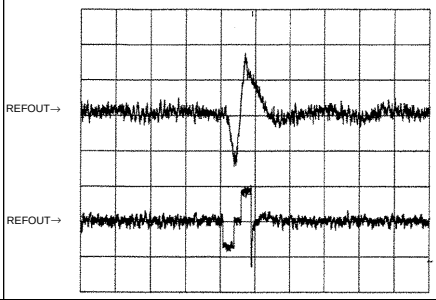
⑥ CH1: FEY 0.5V/div. 1ms/div.
⑦ CH2: XSI 2V/div.
Normal mode: Focus close



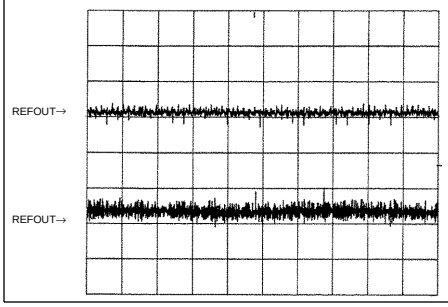
⑧ CH1: TEY 0.5V/div. 0.5ms/div.
⑨ CH2: TIN 0.5V/div.
Test mode: 32 tracks jump (FWD)



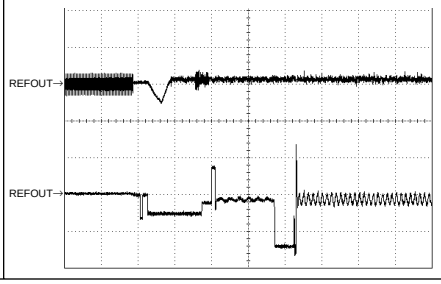
⑧ CH1: TEY 0.5V/div. 0.5ms/div.
⑨ CH2: TIN 0.5V/div.
Test mode: Single jump (FWD)



⑥ CH1: FEY 0.1V/div. 20ms/div.
③ CH2: FIN 0.2V/div.
Normal mode: Play

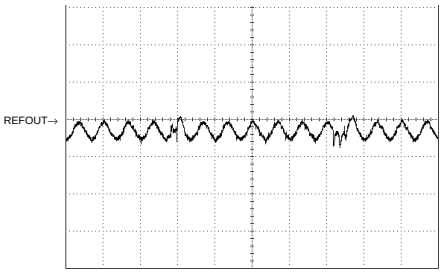


③ CH1: FIN 0.5V/div. 0.5s/div.
⑩ CH2: SIN 1V/div.
Normal mode: Focus close

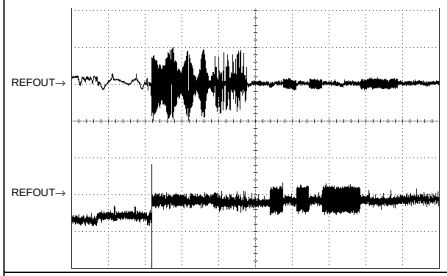


⑩ SIN 0.5V/div. 0.1s/div.

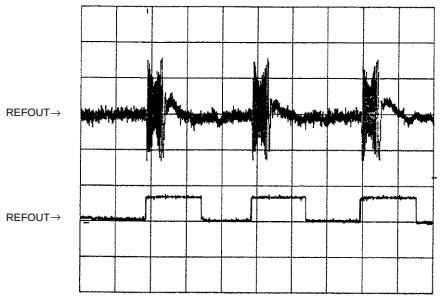
Normal mode: Play



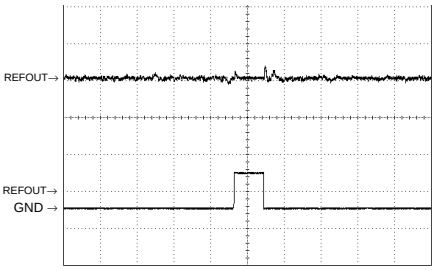
⑧ CH1: TEY 0.5V/div.
⑥ CH2: FEY 0.1V/div. 0.2s/div.
Normal mode: AGC after focus close



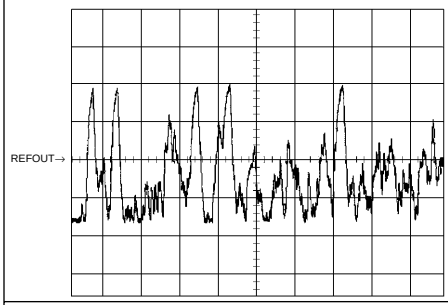
⑧ CH1: TEY 0.5V/div.
⑪ CH2: SD 0.5V/div. 5ms/div.



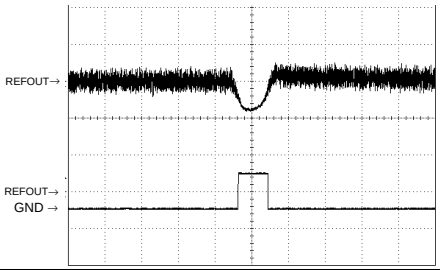
③ CH1: FIN 1V/div.
⑭ CH2: HOLD 5V/div. 500µs/div.
Normal mode: The defect part passes 800µm



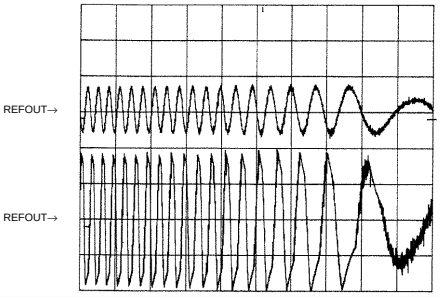
⑩ SIN 1V/div. 10ms/div.
Long Search



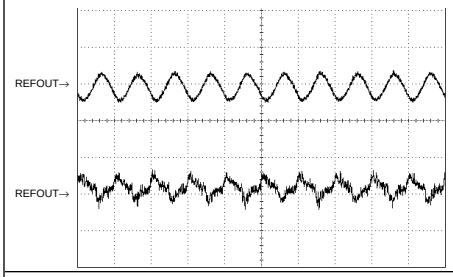
① CH1: RFO 1V/div.
⑭ CH2: HOLD 5V/div. 500µs/div.
Normal mode: The defect part passes 800µm



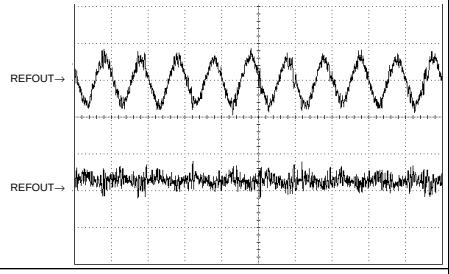
⑧ CH1: TEY 1V/div.
⑬ CH2: TEC 1V/div. 2ms/div.
Test mode: Focus close
Tracking open



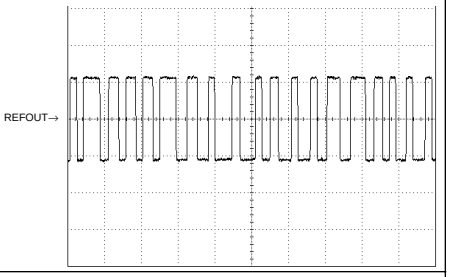
⑥ CH1: FEY 0.2V/div.
③ CH2: FIN 0.5V/div. 1ms/div.
Normal mode: During AGC



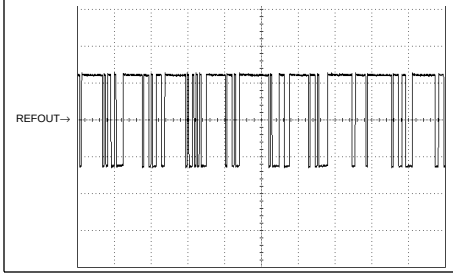
⑧ CH1: TEY 0.2V/div.
⑨ CH2: TIN 0.5V/div. 1ms/div.
Normal mode: During AGC



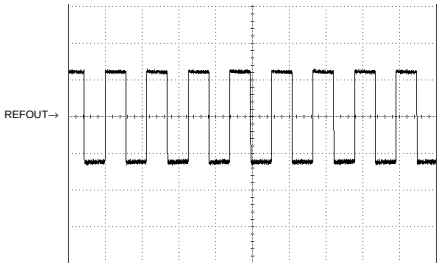
⑫ EFM 1V/div. 2µs/div.
Play



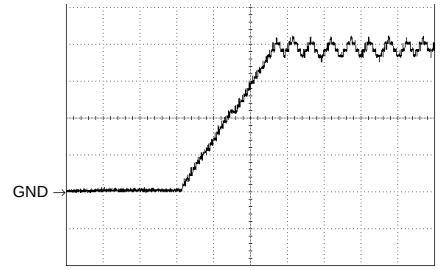
⑮ Dout 2V/div. 5µs/div.
Play

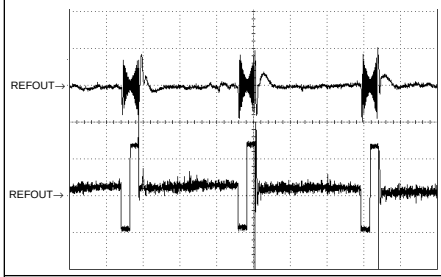
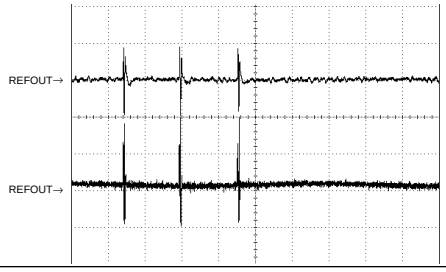
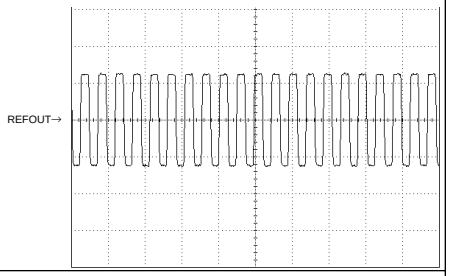
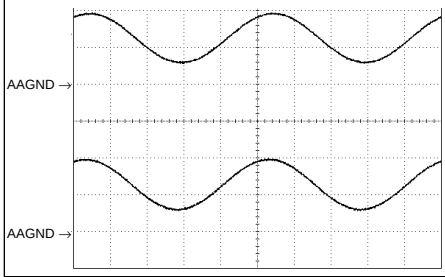


⑯ LRCK 2V/div. 10µs/div.

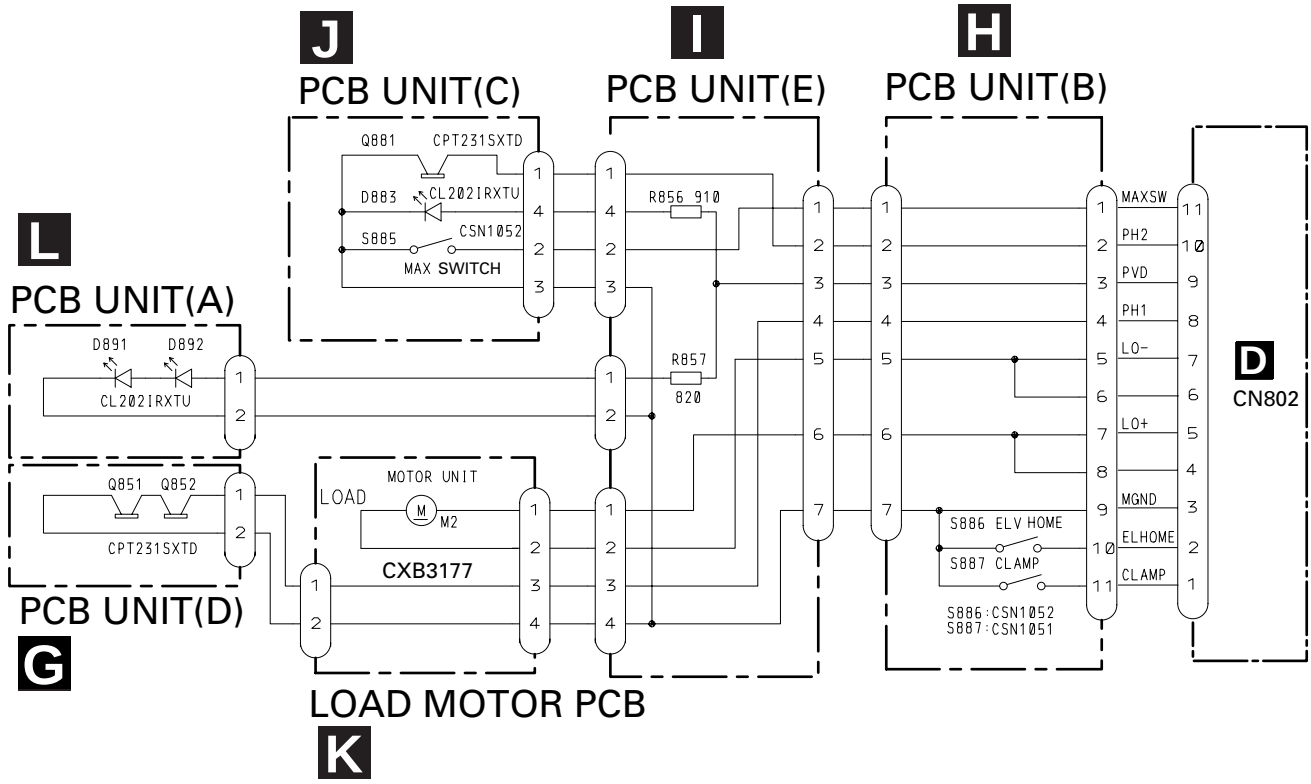


⑱ ADRMON 1V/div. 1s/div.
Normal mode: Starting play



⑧ CH1: TEY 0.5V/div. ⑨ CH2: TIN 0.5V/div. 5ms/div. Test mode: 100 tracks jump(FWD) 	⑧ CH1: TEY 0.5V/div. ⑨ CH2: TIN 0.5V/div. 10ms/div. Normal mode: Play 	⑰ SCKO 2V/div. 500ns/div. Play 
⑳ CH1: RCH 2V/div. ⑲ CH2: LCH 2V/div. 200µs/div. Normal mode: PLAY (0dB,1kHz) 		

3.5 PCB UNIT(A,B,C,D,E), LOAD MOTOR PCB

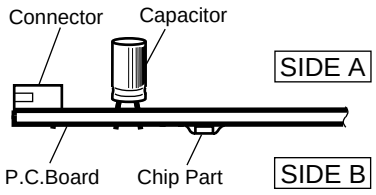


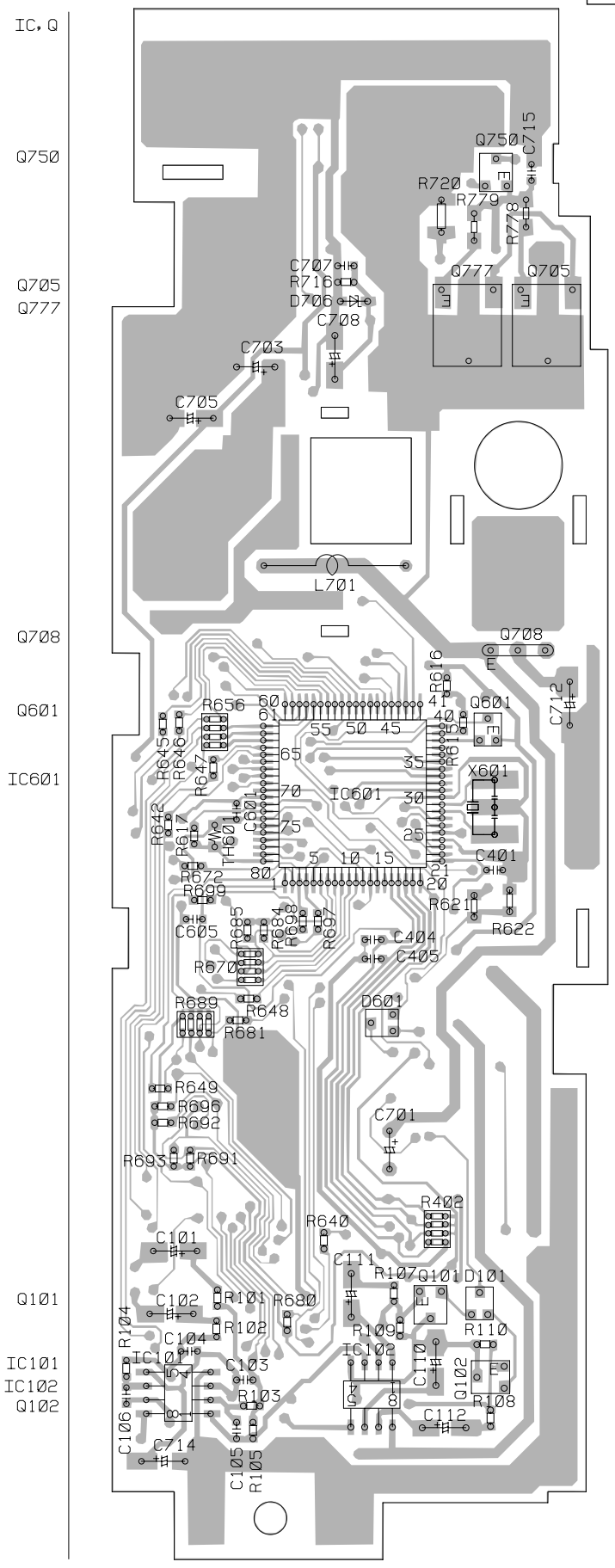
4. PCB CONNECTION DIAGRAM

4.1 EXTENSION UNIT

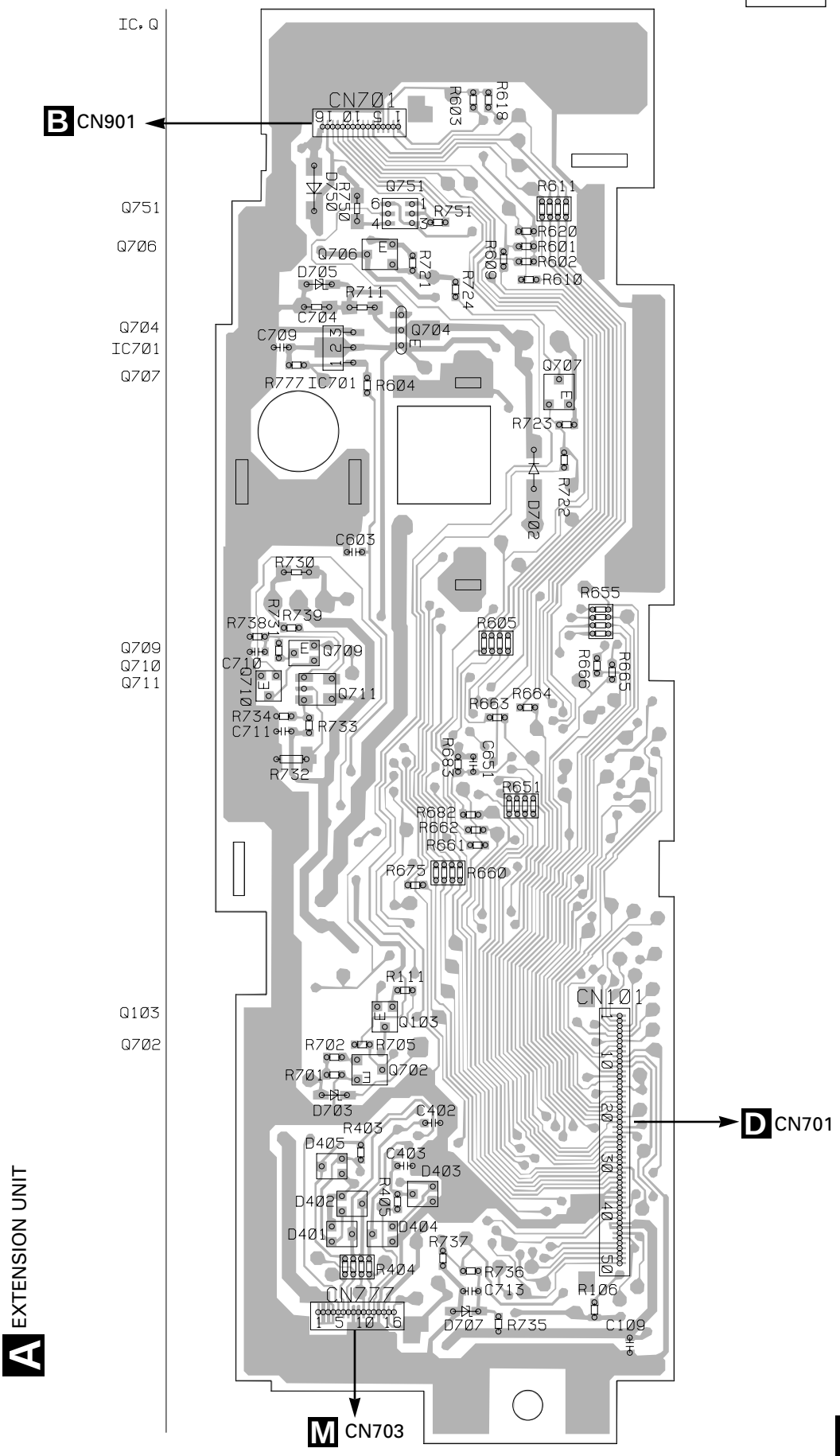
NOTE FOR PCB DIAGRAMS

1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams

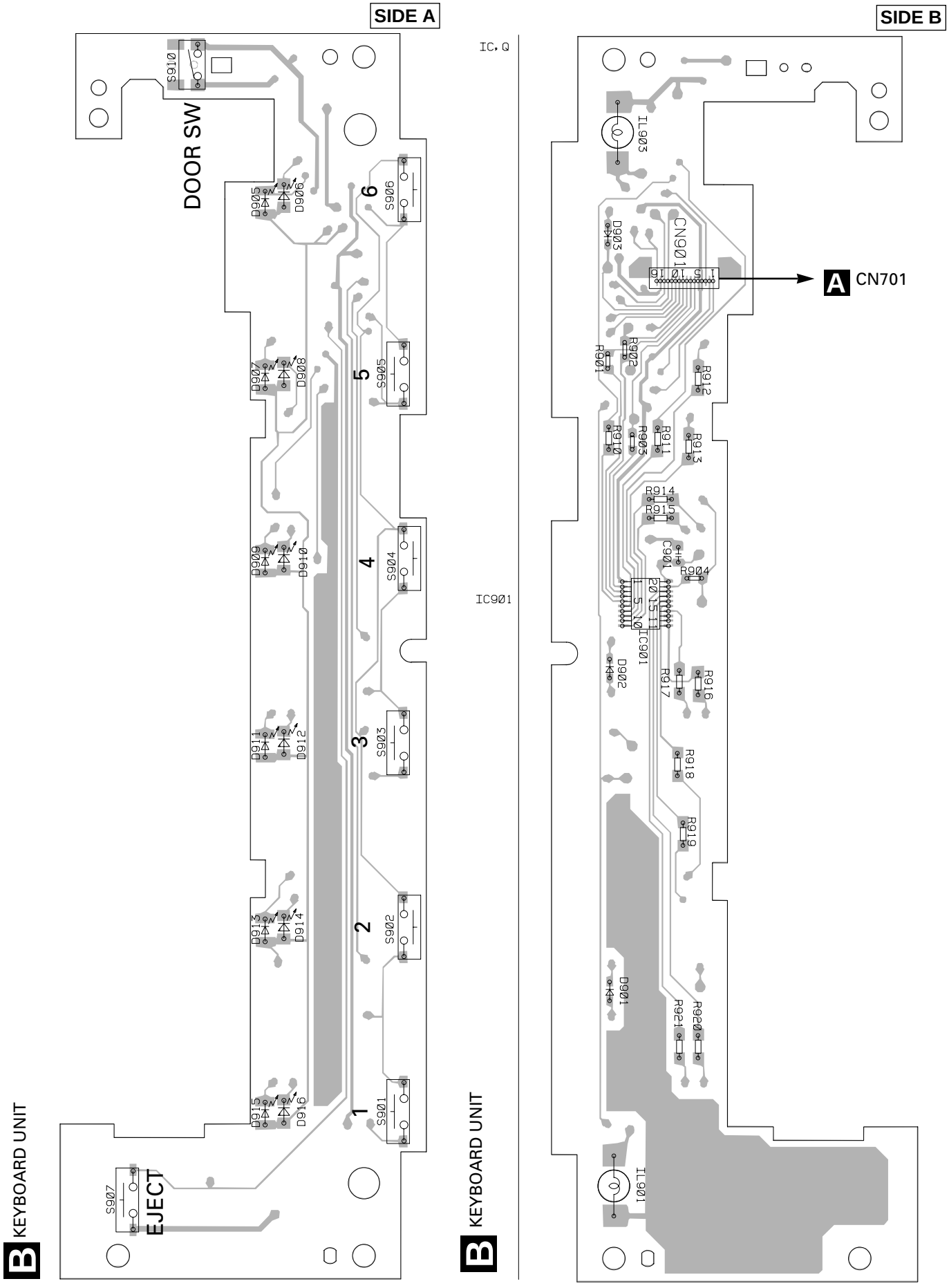




SIDE B


IC, Q
B CN901
CN701
Q751
Q706
Q704
IC701
Q707
Q709
Q710
Q711
Q103
Q702
D CN701
A EXTENSION UNIT
M CN703
CN1Ø1
CN777
R618
R603
R611
R751
R620
R601
R602
R610
R609
R721
R724
R711
C704
C709
R777
IC701
R604
Q707
R723
R722
D702
C603
R730
R655
R739
R738
R605
R665
R666
C710
R734
C711
R733
R732
R664
R663
C651
R683
R651
R682
R662
R661
R675
R660
R111
Q103
R702
R705
R701
Q702
D703
C402
R403
D405
C403
D403
D402
R405
D401
D404
R737
R404
R736
C713
R106
D707
R735
C109

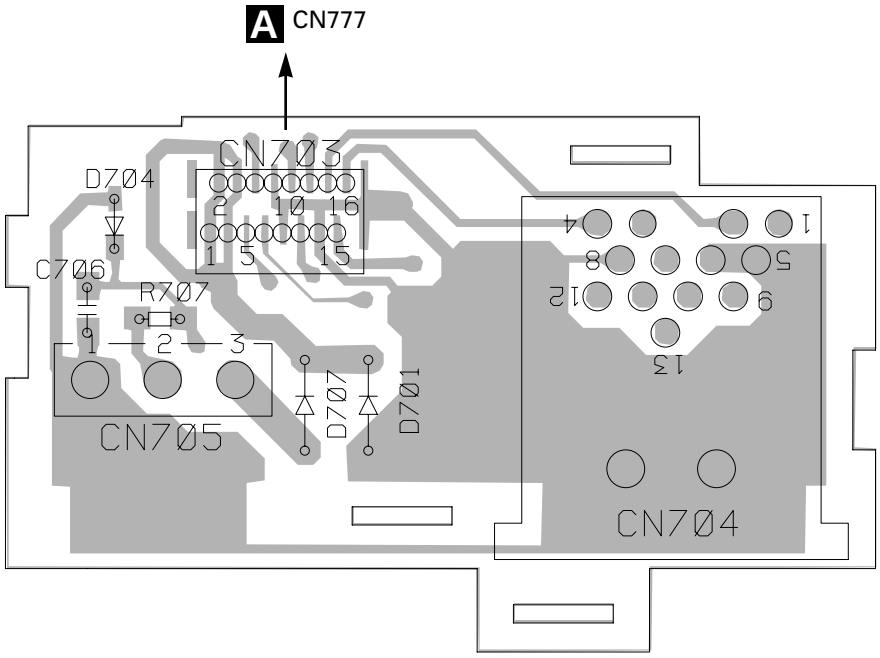
4.2 KEYBOARD UNIT



4.3 CONNECTOR UNIT

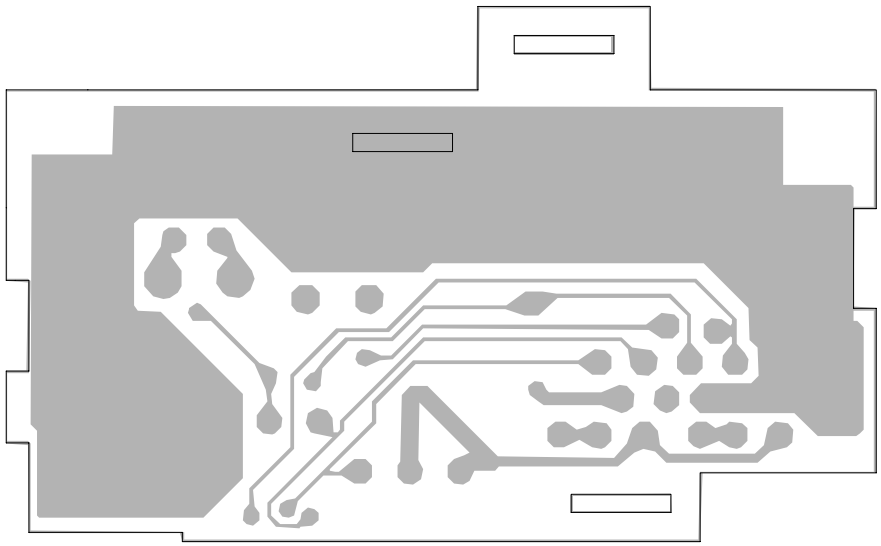
M CONNECTOR UNIT

SIDE A



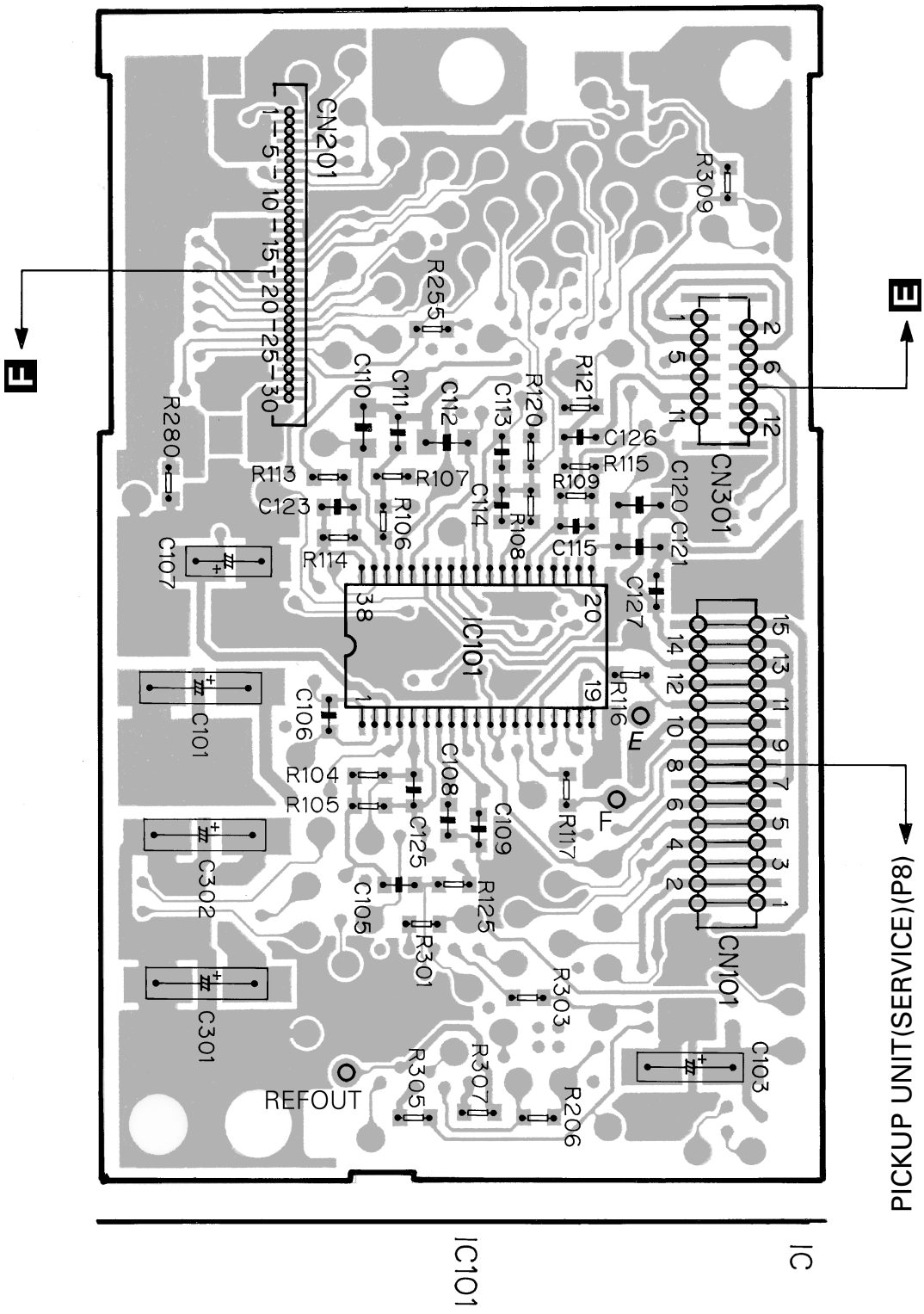
M CONNECTOR UNIT

SIDE B

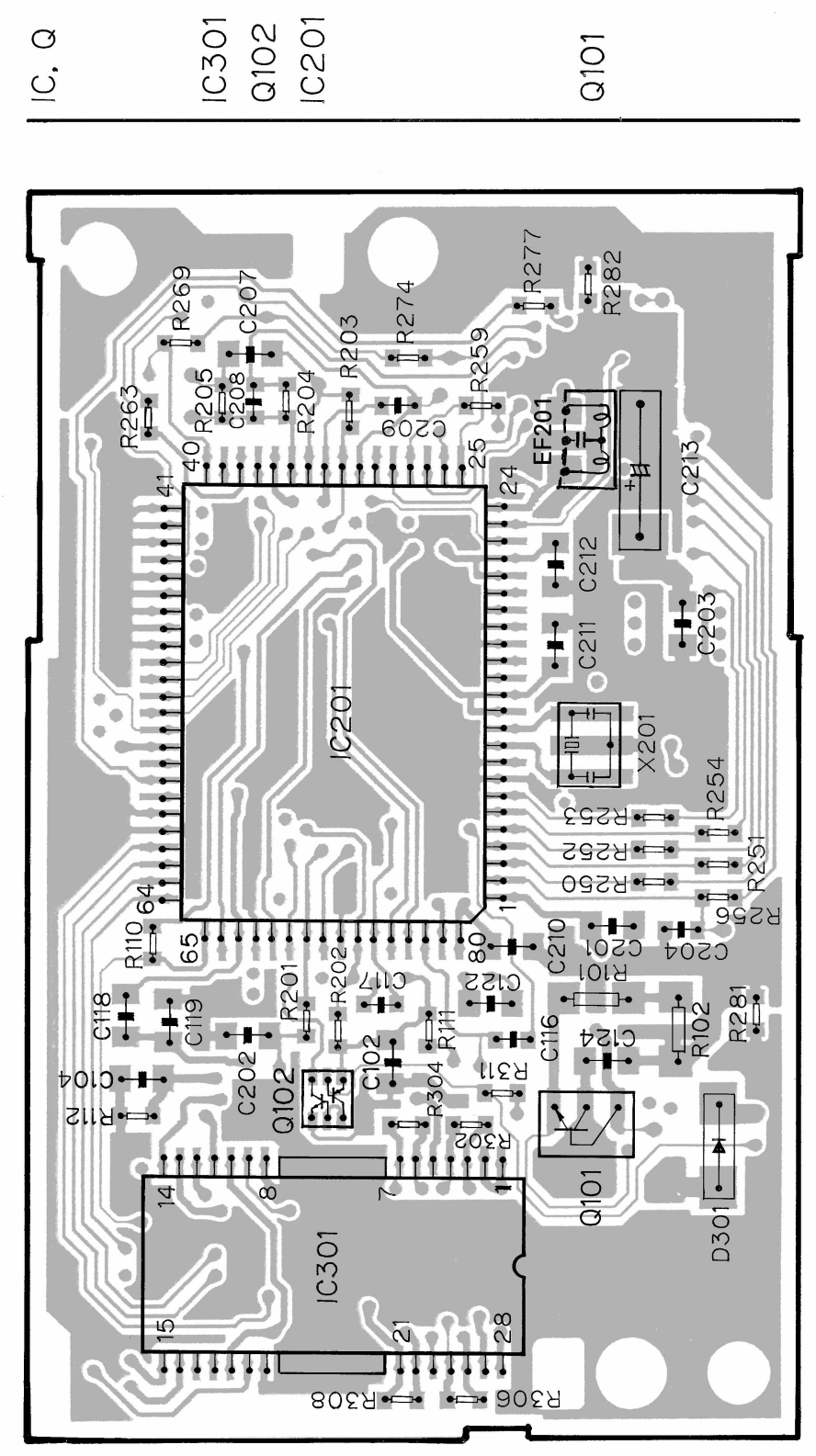


4.4 CD CORE UNIT(SERVO UNIT)

SIDE A



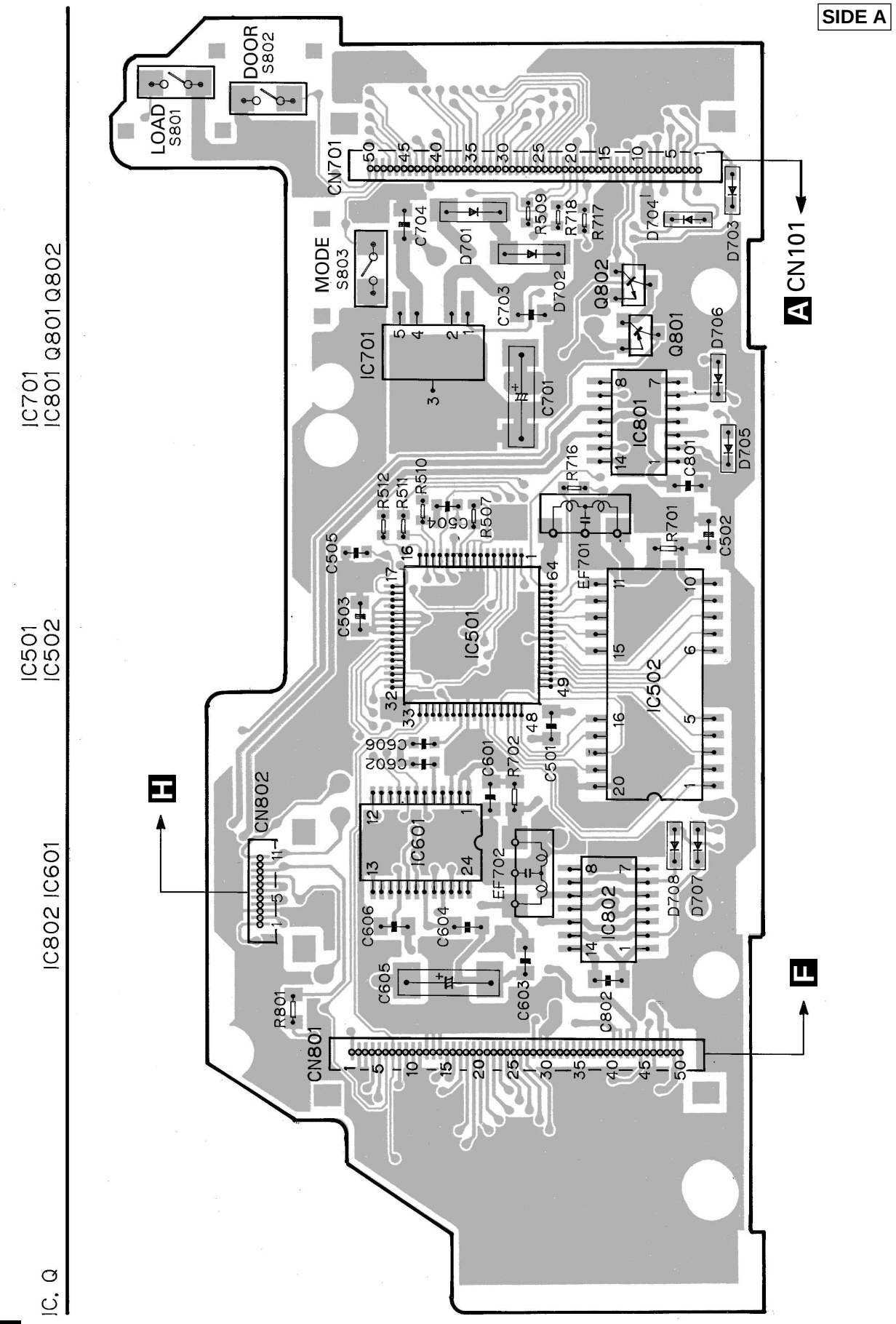
SIDE B



C CD CORE UNIT(SERVO UNIT)

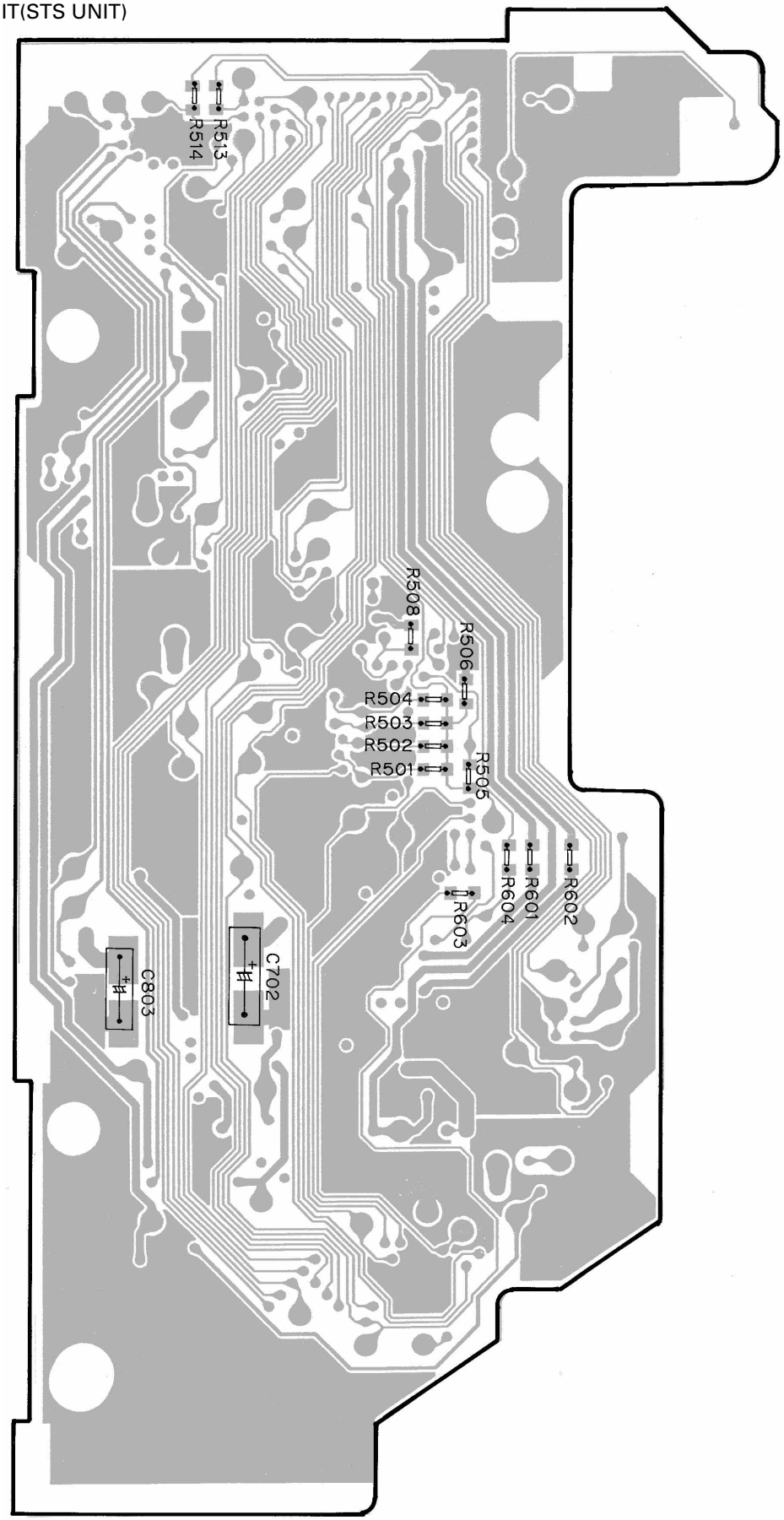
4.5 CD CORE UNIT(STS UNIT)

D CD CORE UNIT(STS UNIT)



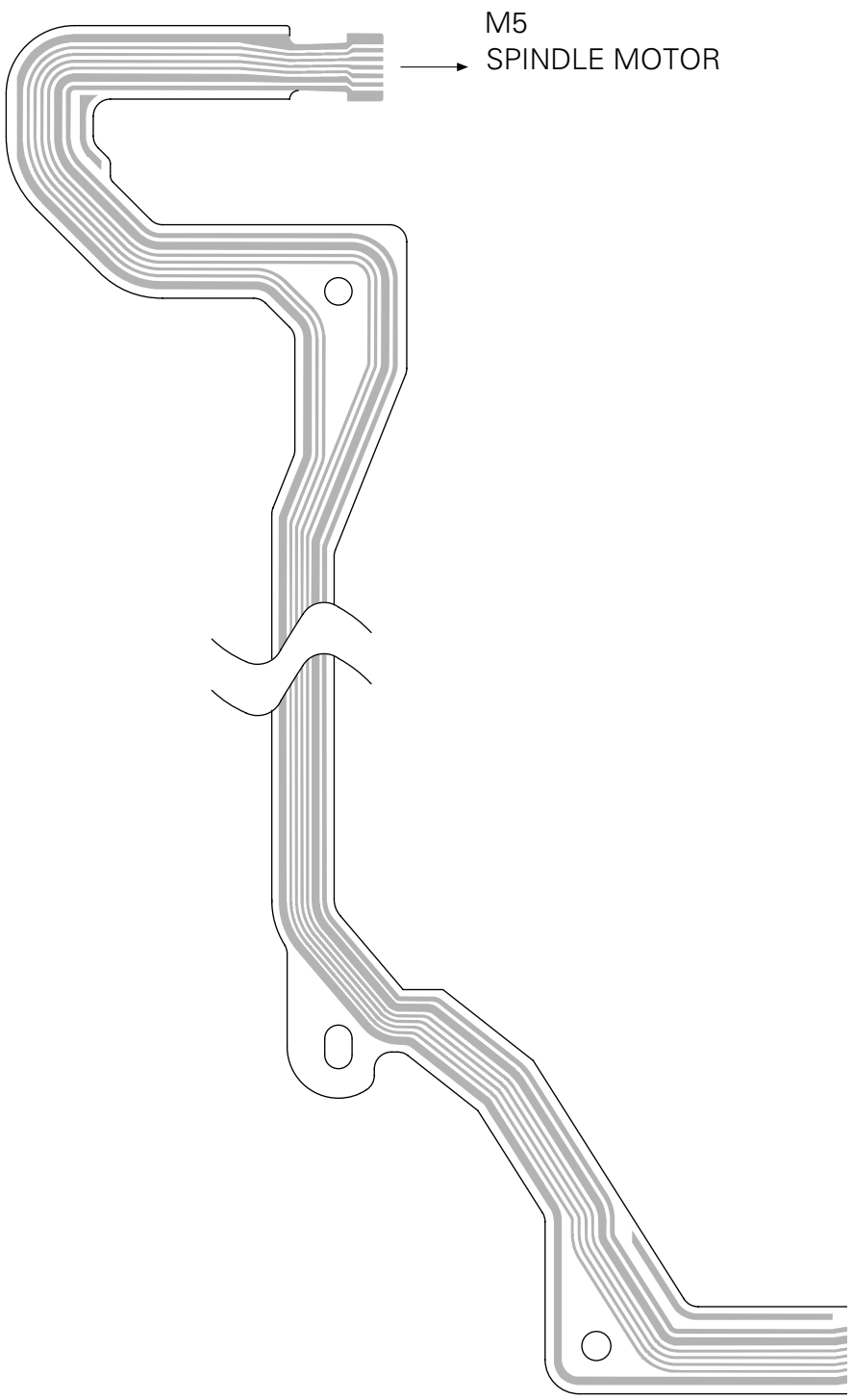
D CD CORE UNIT(STS UNIT)

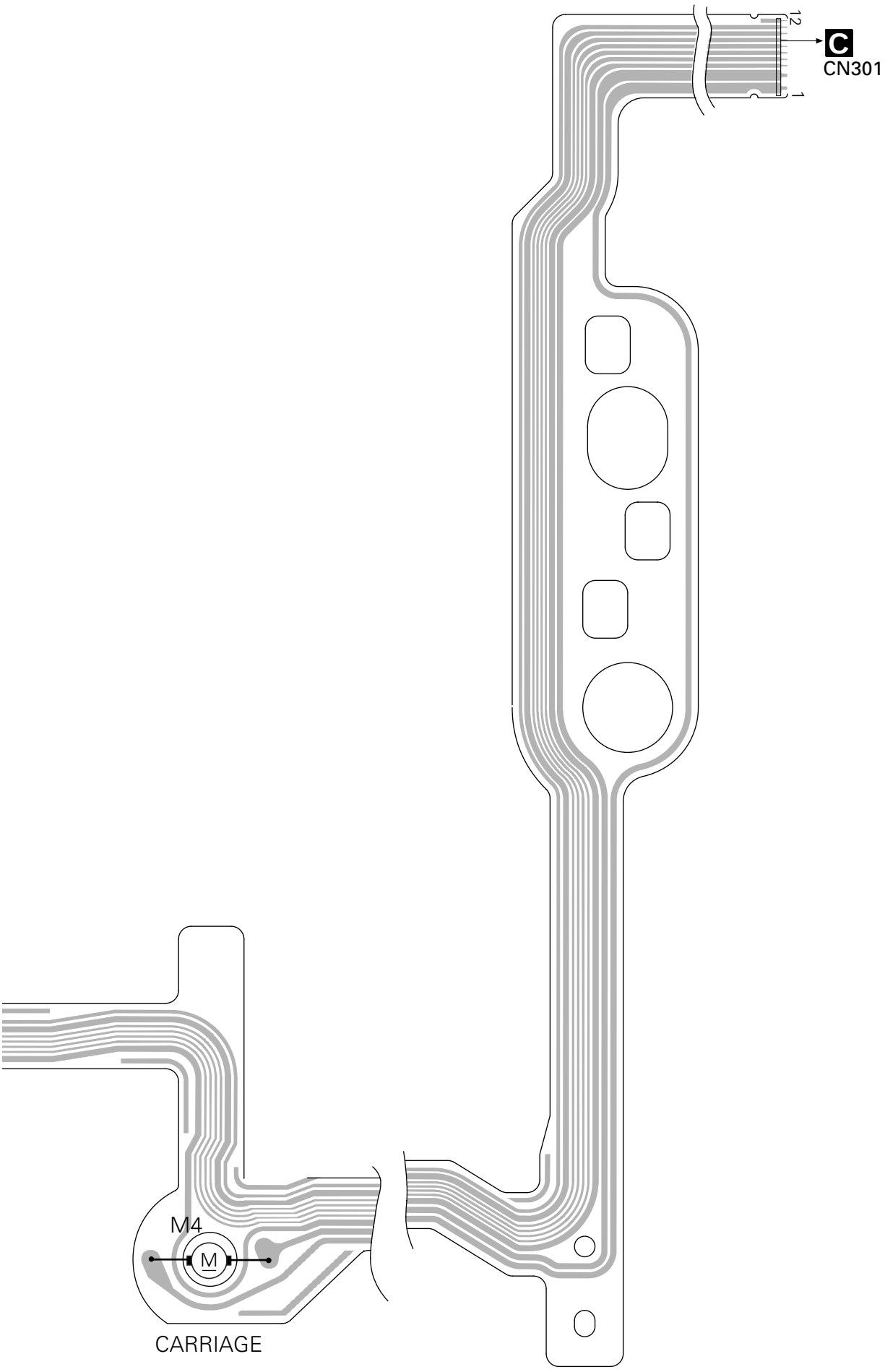
SIDE B



4.6 MOTOR PCB(B)

E MOTOR PCB(B)





A

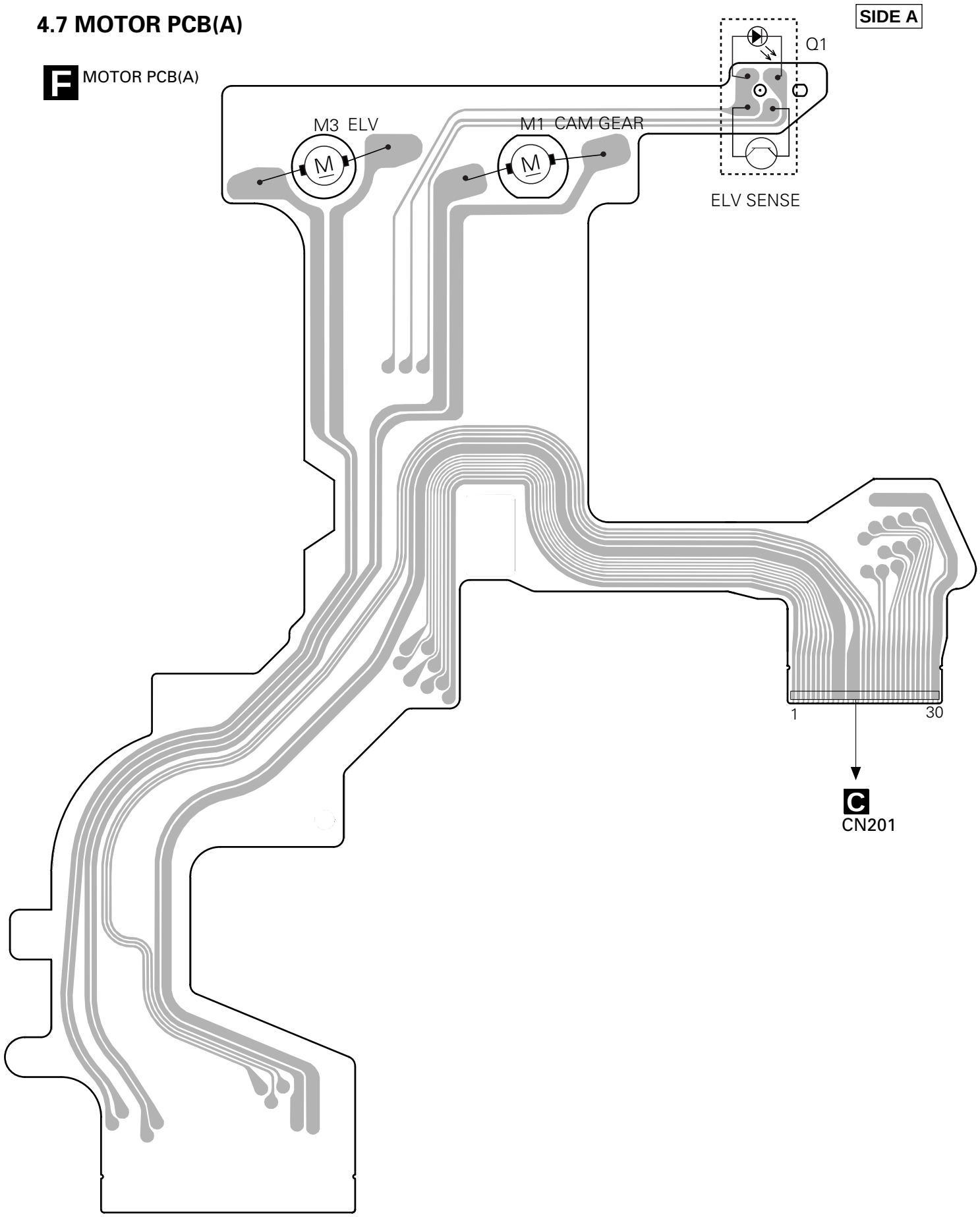
B

C

D

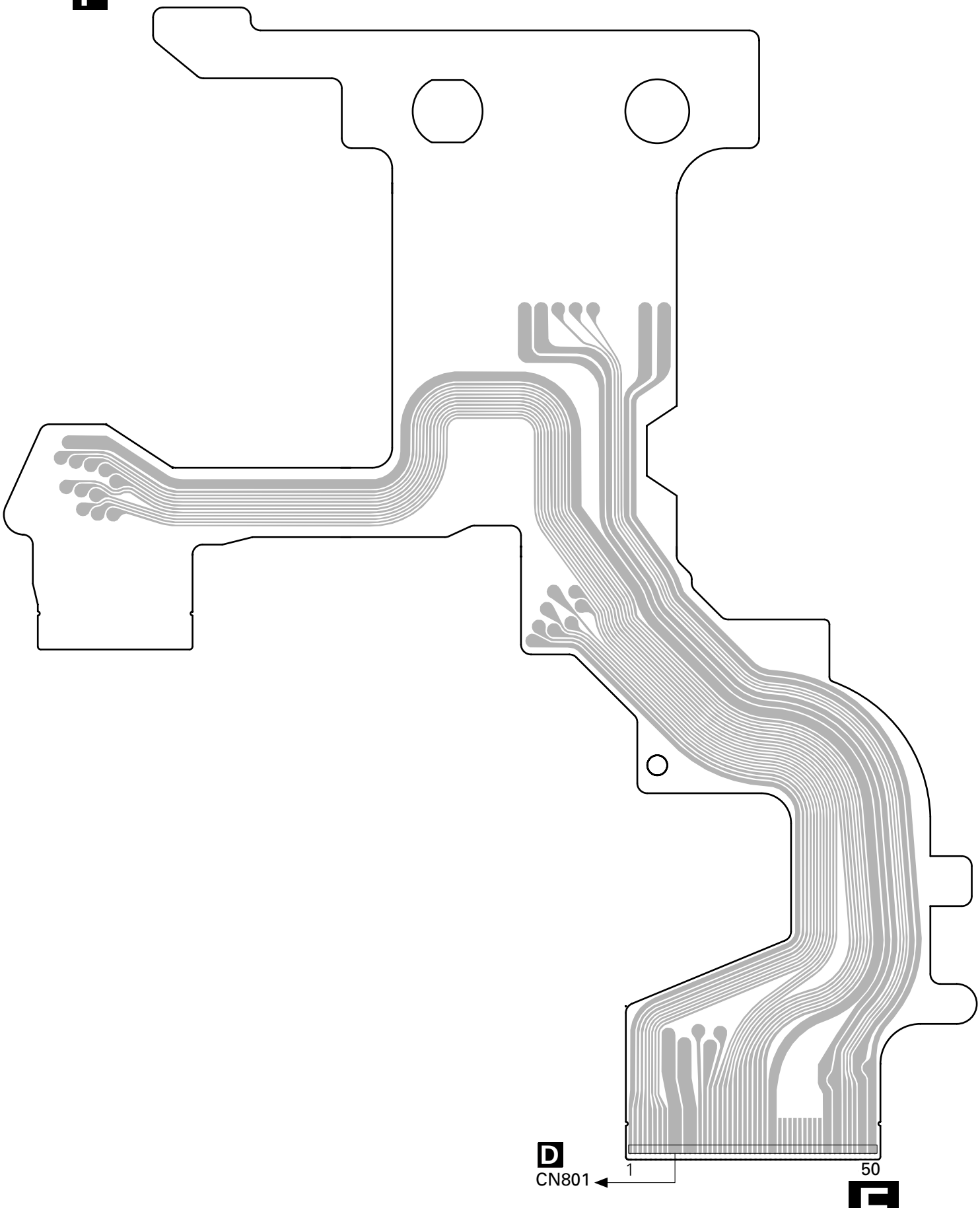
4.7 MOTOR PCB(A)

F MOTOR PCB(A)

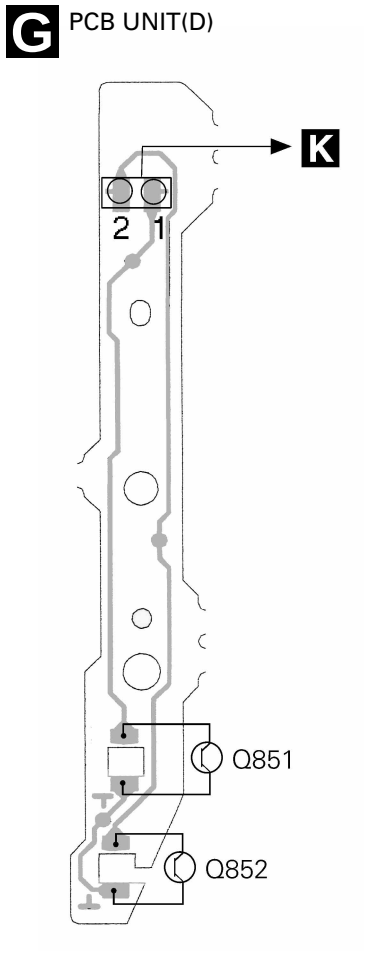


SIDE B

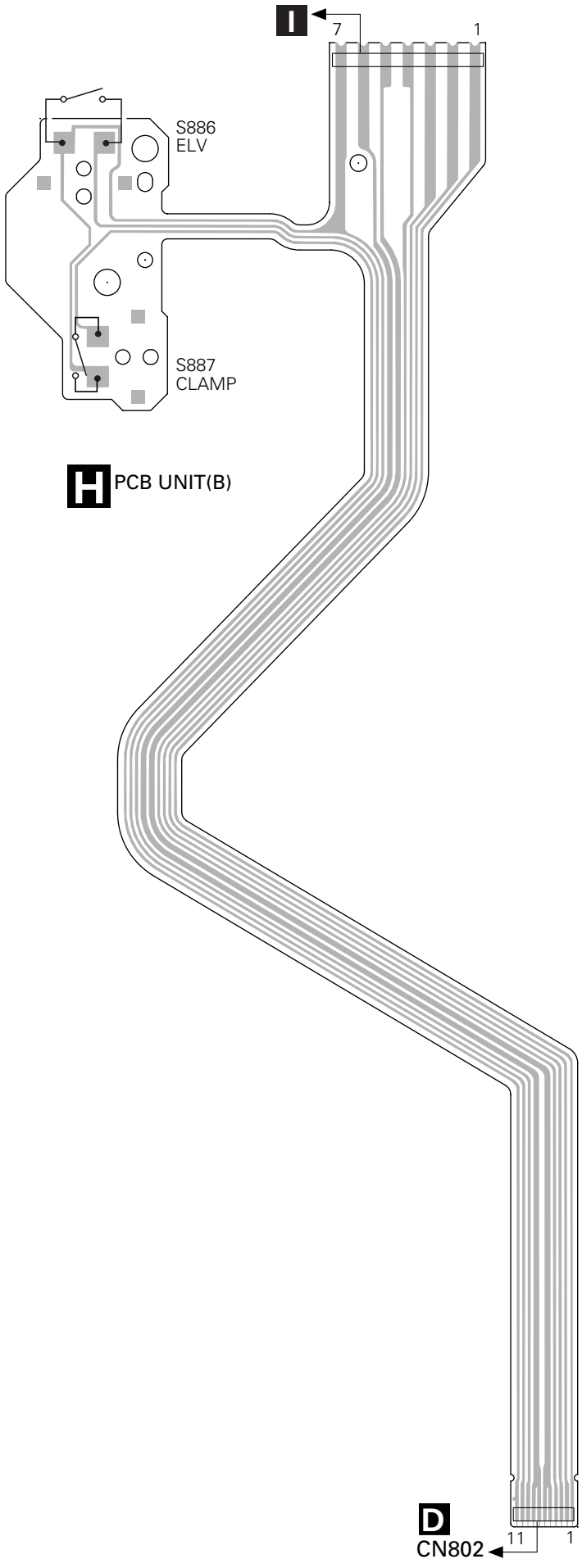
F MOTOR PCB(A)



4.8 PCB UNIT(D)



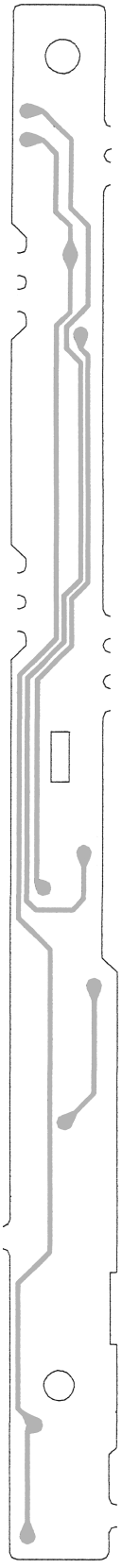
4.9 PCB UNIT(B)



4.10 PCB UNIT(E)

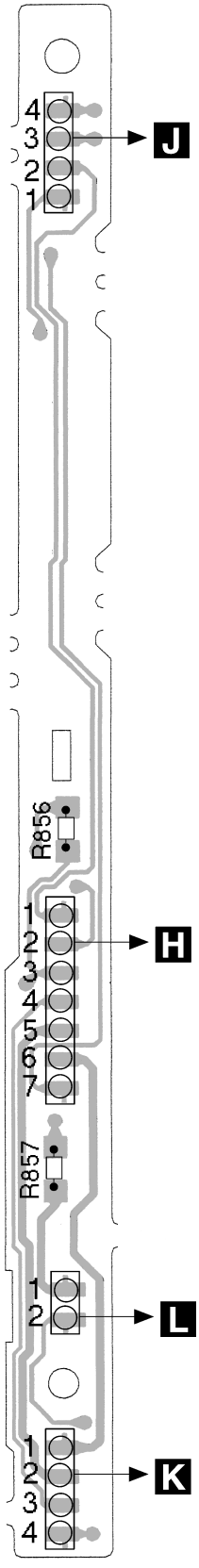
PCB UNIT(E)

SIDE A



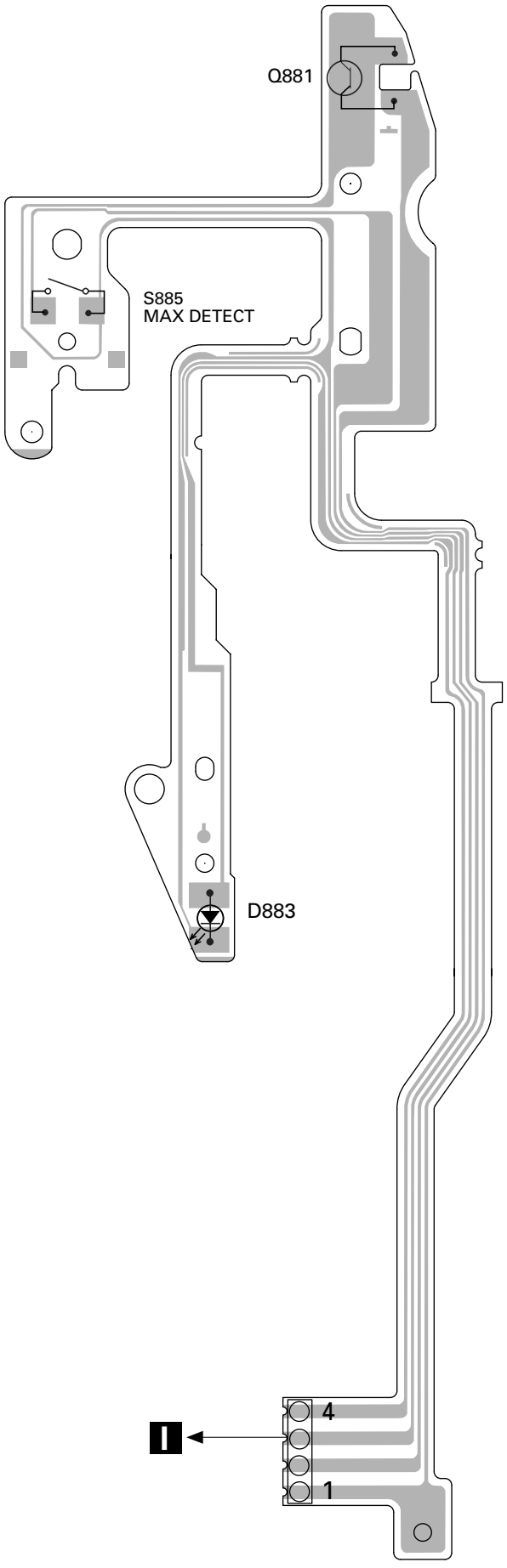
PCB UNIT(E)

SIDE B

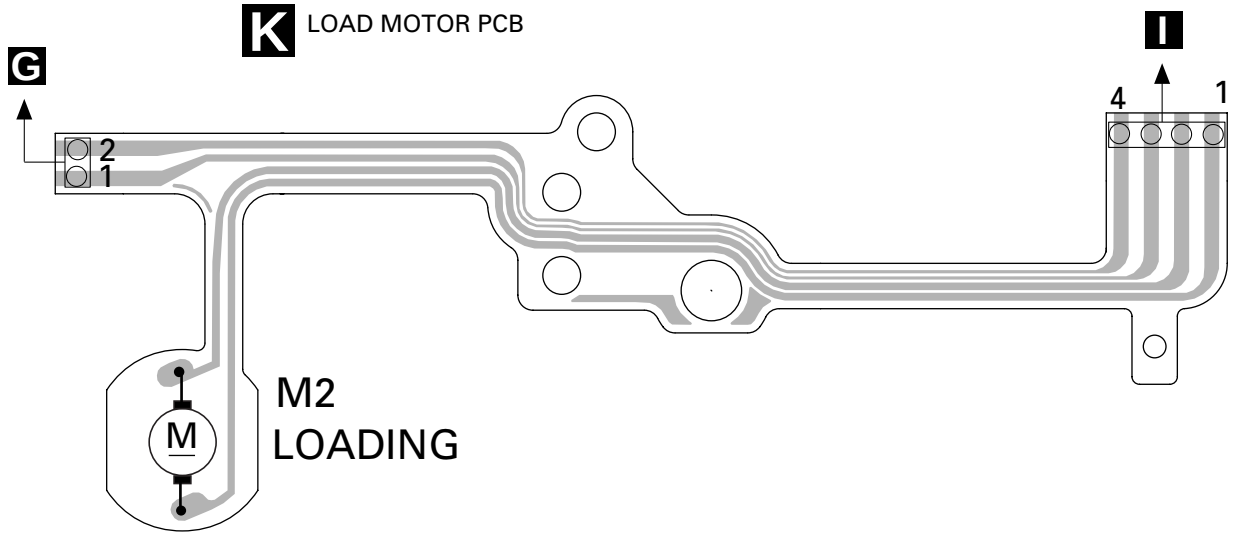


4.11 PCB UNIT(C)

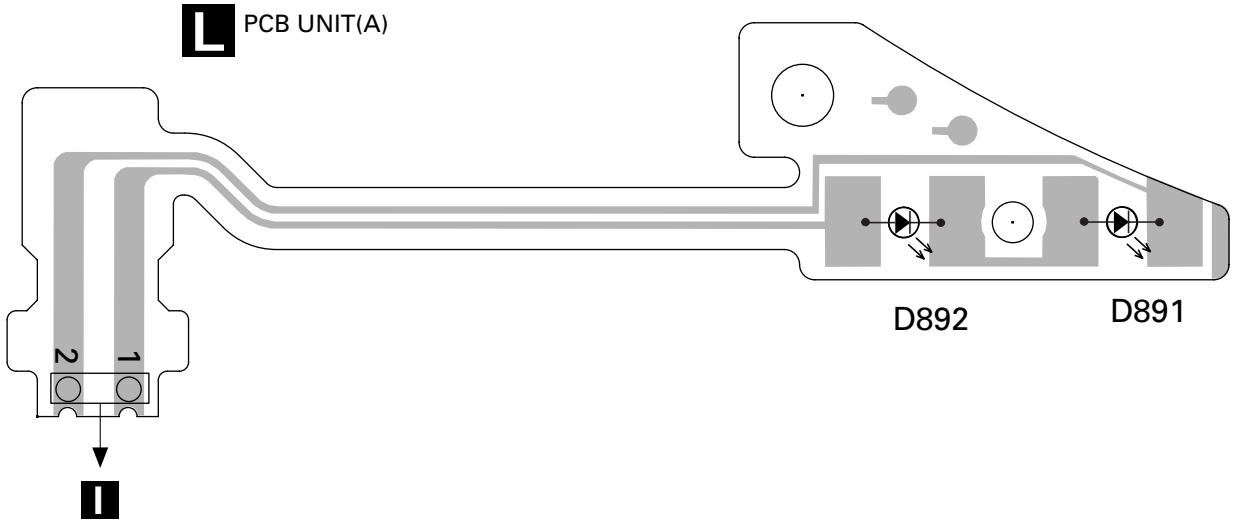
J PCB UNIT(C)



4.12 LOAD MOTOR PCB



4.13 PCB UNIT(A)



5. ELECTRICAL PARTS LIST

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

A Unit Number : CWM6824
Unit Name : Extension Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	101	IC	NJM4558MD
IC	102	IC	BA3121F
IC	601	IC	PD5553A
IC	701	IC	S-80740AND4I
Q	101	Transistor	DTC343TK
Q	102	Transistor	DTC343TK
Q	103	Transistor	2SA1586
Q	601	Transistor	DTA124EU
Q	702	Chip Transistor	2SC2712
Q	704	Transistor	2SD1007
Q	705	Transistor	2SD1760F5
Q	706	Transistor	2SA1163
Q	707	Chip Transistor	2SC2712
Q	708	Transistor	2SB1335A
Q	709	Transistor	DTA124EU
Q	710	Transistor	DTC124EU
Q	711	Transistor	FMW1
Q	750	Transistor	2SA1162
Q	751	Transistor	IMH11A
Q	777	Transistor	2SD1760F5
D	101	Diode	MA142WA
D	401	Diode	MA143
D	402	Diode	MA143
D	403	Diode	MA143
D	404	Diode	MA143
D	405	Diode	MA143
D	601	Diode	MA142WK
D	702	Diode	1SR154-400
D	703	Diode	UDZS6R8(B)
D	705	Diode	UDZS5R6(B)
D	706	Diode	DTZ8R2(C)
D	707	Diode	UDZS6R2(B)
D	750	Diode	PTZ3R6(A)
L	701	Coil	CTH1190
TH	601	Thermistor	CCX1032
X	601	Radiator 6.290MHz	CSS1451

RESISTORS

=====Circuit Symbol and No.		===Part Name	Part No.
R	101		RS1/16S562J
R	102		RS1/16S562J
R	103		RS1/16S682J
R	104		RS1/16S682J
R	105		RS1/16S432J
R	106		RS1/16S432J
R	107		RS1/16S102J
R	108		RS1/16S102J
R	109		RS1/16S272J
R	110		RS1/16S272J
R	111		RS1/16S103J
R	402		RA4C473J
R	403		RS1/16S104J
R	404		RA4C681J
R	405		RS1/16S681J
R	601		RS1/16S473J
R	602		RS1/16S473J
R	603		RS1/16S473J
R	604		RS1/16S102J
R	605		RA4C222J
R	609		RS1/16S222J
R	610		RS1/16S222J
R	611		RA4C561J
R	615		RS1/16S102J
R	616		RS1/16S473J
R	617		RN1/16SE1502D
R	618		RS1/16S222J
R	620		RS1/16S473J
R	621		RN1/10SE4302D
R	622		RN1/10SE1002D
R	640		RS1/16S471J
R	642		RS1/16S471J
R	645		RS1/16S471J
R	646		RS1/16S471J
R	647		RS1/16S471J
R	648		RS1/16S471J
R	649		RS1/16S222J
R	651		RA4C222J
R	655		RA4C471J
R	656		RA4C471J
R	660		RA4C471J
R	661		RS1/16S102J
R	662		RS1/16S102J
R	663		RS1/16S102J
R	664		RS1/16S102J
R	665		RS1/16S102J
R	666		RS1/16S471J
R	670		RA4C331J
R	672		RS1/16S331J
R	675		RS1/16S471J
R	680		RS1/16S154J
R	681		RS1/16S222J
R	682		RS1/16S102J
R	683		RS1/16S912J
R	684		RS1/16S102J
R	685		RS1/16S102J
R	689		RA4C104J
R	691		RS1/16S273J
R	692		RS1/16S512J
R	693		RS1/16S104J
R	696		RS1/16S104J
R	697		RS1/16S222J
R	698		RS1/16S222J
R	699		RS1/16S222J
R	701		RS1/16S104J

=====Circuit Symbol and No.		===Part Name	Part No.
R	702		RS1/16S473J
R	705		RS1/16S473J
R	711		RS1/10S682J
R	720		RS1/4S331J
R	721		RS1/16S223J
R	722		RS1/16S103J
R	723		RS1/16S223J
R	724		RS1/16S223J
R	730		RS1/10S223J
R	731		RS1/16S101J
R	732		RS1/4S221J
R	733		RS1/16S511J
R	734		RS1/16S681J
R	735		RS1/16S561J
R	736		RS1/16S103J
R	737		RS1/16S273J
R	738		RS1/16S473J
R	739		RS1/16S101J
R	750		RS1/10S102J
R	751		RS1/16S103J
R	777		RS1/16S104J
R	778		RS1/10S1R0J
R	779		RS1/10S1R0J

CAPACITORS

C	101		CEV100M16
C	102		CEV100M16
C	103		CKSRYB272K50
C	104		CKSRYB272K50
C	105		CCSRCH471J50
C	106		CCSRCH471J50
C	109		CKSRYB473K16
C	110		CEV4R7M25
C	111		CEV220M6R3
C	112		CEV220M6R3
C	401		CCSRCH221J50
C	402		CCSRCH221J50
C	403		CCSRCH221J50
C	404		CKSRYB103K50
C	405		CKSRYB103K50
C	601		CKSRYB104K16
C	603		CKSRYB103K50
C	605		CKSRYB103K50
C	651		CKSRYB103K50
C	701		CEAT471M16
C	703		CEAT471M16
C	704		CKSQYB224K16
C	705		CEV220M6R3
C	707		CKSRYB473K16
C	708		CEV4R7M25
C	709		CKSRYB473K16
C	710		CKSRYB473K16
C	711		CKSRYB103K50
C	712		CEV220M16
C	713		CKSRYB473K16
C	714		CEV470M6R3
C	715		CKSRYB473K16

M Unit Number : CWM6823
Unit Name : Connector Unit

MISCELLANEOUS

D	701	Diode	ERA15-02VH
D	704	Diode	1SS355
D	707	Diode	ERA15-02VH

=====Circuit Symbol and No.		===Part Name	Part No.

RESISTORS

R	707		RS1/10S103J

CAPACITORS

C	706		CKSQYB104K50

B Unit Number : CWM6822
Unit Name : Keyboard Unit

MISCELLANEOUS

IC	901	IC	BU2092FV
D	901	Diode	1SS355
D	902	Diode	1SS355
D	903	Diode	1SS355
D	905	LED	CL200PGCTU
D	906	LED	CL150DCD(AB)
D	907	LED	CL200PGCTU
D	908	LED	CL150DCD(AB)
D	909	LED	CL200PGCTU
D	910	LED	CL150DCD(AB)
D	911	LED	CL200PGCTU
D	912	LED	CL150DCD(AB)
D	913	LED	CL200PGCTU
D	914	LED	CL150DCD(AB)
D	915	LED	CL200PGCTU
D	916	LED	CL150DCD(AB)
S	901	Switch	CSG1043
S	902	Switch	CSG1043
S	903	Switch	CSG1043
S	904	Switch	CSG1043
S	905	Switch	CSG1043
S	906	Switch	CSG1043
S	907	Switch	CSG1043
S	910	Spring Switch	CSN1033
IL	901	Lamp 60mA,8V	CEL1617
IL	903	Lamp 60mA,8V	CEL1617

RESISTORS

R	901		RS1/10S561J
R	902		RS1/10S561J
R	903		RS1/10S561J
R	904		RS1/10S561J
R	910		RS1/8S431J
R	911		RS1/8S471J
R	912		RS1/8S431J
R	913		RS1/8S471J
R	914		RS1/8S431J
R	915		RS1/8S471J
R	916		RS1/8S431J
R	917		RS1/8S471J
R	918		RS1/8S431J
R	919		RS1/8S471J
R	920		RS1/8S431J
R	921		RS1/8S471J

CAPACITORS

C	901		CKSQYB104K16

C Unit Number : CWX2202
Unit Name : CD Core Unit(Servo Unit)

MISCELLANEOUS

IC	101	IC	UPC2572GS
IC	201	IC	UPD63702AGF
IC	301	IC	BA5986FM
Q	101	Transistor	2SD1664
Q	102	Transistor	UMD2N
D	301	Diode	1SR154-400
X	201	Ceramic Resonator 16.934MHz	CSS1457
EF	201	Filter	CCG1076

RESISTORS

R	101	RS1/8S100J
R	102	RS1/8S120J
R	104	RS1/16S822J
R	105	RS1/16S682J
R	106	RS1/16S183J
R	107	RS1/16S822J
R	108	RS1/16S333J
R	109	RS1/16S683J
R	110	RS1/16S134J
R	111	RS1/16S273J
R	112	RS1/16S222J
R	113	RS1/16S103J
R	114	RS1/16S103J
R	115	RS1/16S102J
R	116	RS1/16S163J
R	117	RS1/16S163J
R	120	RS1/16S101J
R	121	RS1/16S101J
R	125	RS1/16S0R0J
R	201	RS1/16S104J
R	202	RS1/16S103J
R	203	RS1/16S332J
R	204	RS1/16S752J
R	205	RS1/16S752J
R	206	RS1/16S101J
R	250	RS1/16S331J
R	251	RS1/16S331J
R	252	RS1/16S331J
R	253	RS1/16S331J
R	254	RS1/16S331J
R	255	RS1/16S471J
R	256	RS1/16S471J
R	259	RS1/16S221J
R	263	RS1/16S471J
R	269	RS1/16S0R0J
R	274	RS1/16S471J
R	277	RS1/16S471J
R	301	RS1/16S103J
R	302	RS1/16S153J
R	303	RS1/16S103J
R	304	RS1/16S273J
R	305	RS1/16S103J
R	306	RS1/16S752J
R	307	RS1/16S103J
R	308	RS1/16S103J
R	309	RS1/16S471J
R	311	RS1/16S471J

CAPACITORS

C	101	CEV101M6R3
C	102	CKSQYB104K16
C	103	CEV470M6R3
C	104	CKSQYB334K16
C	105	CCSRCH240J50
C	106	CKSRYB222K50
C	107	CEV4R7M35
C	108	CKSRYB273K25
C	109	CCSRCH101J50
C	110	CKSQYB104K16
C	111	CKSRYB332K50
C	112	CKSQYB473K16
C	113	CKSRYB103K25
C	114	CKSRYB391K50
C	115	CCSRCH121J50
C	116	CKSRYB682K50
C	117	CKSRYB333K16
C	118	CKSQYB334K16
C	119	CKSQYB334K16
C	120	CKSQYB334K16
C	121	CKSQYB334K16
C	122	CKSQYB104K16
C	123	CKSRYB472K50
C	124	CKSQYB104K16
C	125	CCSRCH5R0C50
C	126	CKSRYB153K25
C	127	CKSRYB102K50
C	201	CKSQYB334K16
C	202	CKSQYB104K16
C	203	CKSQYB104K16
C	204	CKSRYB471K50
C	207	CKSQYB683K16
C	208	CKSRYB821K50
C	209	CKSRYB273K25
C	210	CKSQYB334K16
C	211	CKSQYB334K16
C	212	CKSQYB334K16
C	213	22µF/6.3V CCH1300
C	301	CEV101M10
C	302	CEV101M10

D Unit Number : CWX2203
Unit Name : CD Core Unit(STS Unit)

MISCELLANEOUS

IC	501	IC	CXD2511R
IC	502	IC	MSM514400DP-60TS
IC	601	IC	AK4321VF
IC	701	IC	BA05SFP
IC	801	IC	LB1836M
IC	802	IC	LB1836M
Q	801	Transistor	DTA123JK
Q	802	Transistor	UN2211
D	701	Diode	1SR154-400
D	702	Diode	1SR154-400
D	703	Diode	1SS355
D	704	Diode	1SS355
D	705	Diode	1SS355
D	706	Diode	1SS355
D	707	Diode	1SS355
D	708	Diode	1SS355
S	801	Spring Switch(LOAD)	CSN1052
S	802	Spring Switch(DOOR)	CSN1052
S	803	Spring Switch(MODE)	CSN1052
EF	701	Filter	CCG1051
EF	702	Filter	CCG1051

RESISTORS

R	501	RS1/16S102J
R	502	RS1/16S202J
R	503	RS1/16S392J
R	504	RS1/16S822J
R	505	RS1/16S163J

=====Circuit Symbol and No.		===Part Name	Part No.
R	506		RS1/16S512J
R	507		RS1/16S182J
R	508		RS1/16S222J
R	509		RS1/16S102J
R	510		RS1/16S102J
R	511		RS1/16S102J
R	512		RS1/16S102J
R	513		RS1/16S102J
R	514		RS1/16S471J
R	601		RS1/16S101J
R	602		RS1/16S101J
R	603		RS1/16S471J
R	604		RS1/16S471J
R	701		RS1/10S0R0J
R	702		RS1/10S100J
R	716		RS1/16S471J
R	717		RS1/16S471J
R	718		RS1/16S471J
R	801		RS1/10S102J

CAPACITORS

C	501		CKSQYB334K16
C	502		CKSQYB334K16
C	503		CKSQYB334K16
C	504		CCSRCH471J50
C	506		CCSRCH221J50
C	601		CKSQYB334K16
C	602		CCSRCH221J50
C	603		CKSQYB334K16
C	604		CKSQYB334K16
C	605	22µF/6.3V	CCH1300
C	606		CKSQYB334K16
C	701	22µF/6.3V	CCH1300
C	702		CEVL101M6R3
C	703		CKSQYB334K16
C	704		CKSQYB334K16
C	801		CKSQYB104K25
C	802		CKSQYB104K25
C	803		CEVL220M16

G Unit Number :
Unit Name : PCB Unit(D)

Q	851	Photo-transistor	CPT231SXTD
Q	852	Photo-transistor	CPT231SXTD

I Unit Number :
Unit Name : PCB Unit(E)

R	856		RS1/8S911J
R	857		RS1/8S821J

J Unit Number :
Unit Name : PCB Unit(C)

Q	881	Photo-transistor	CPT231SXTD
D	883	Chip LED	CL202IRXTU
S	885	Spring Switch(MAX)	CSN1052

L Unit Number :
Unit Name : PCB Unit(A)

D	891	Chip LED	CL202IRXTU
D	892	Chip LED	CL202IRXTU

H Unit Number :
Unit Name : PCB Unit(B)

S	886	Spring Switch(ELV Home)	CSN1052
S	887	Spring Switch(Clamp)	CSN1051

F Unit Number :
Unit Name : Motor PCB(A)

Q	1	Photo-interrupter	RPI-221
M	1	Motor Unit(Cam Gear)	CXB3174
M	3	Motor Unit(ELV)	CXB3175

E Unit Number :
Unit Name : Motor PCB(B)

M	4	Motor Unit(Carriage)	CXB3178
M	5	Motor(Spindle)	CXM1120

K Unit Number :
Unit Name : Load Motor PCB

M	2	Motor Unit(Load)	CXB3177

Miscellaneous Parts List

	Pickup Unit(Service)(P8)	CXX1311

6. ADJUSTMENT

CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

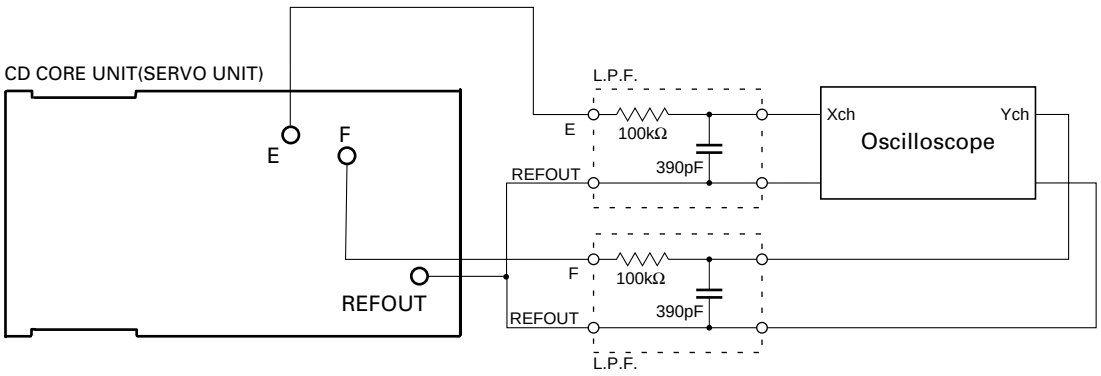
• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

• **Method :**

• Measuring Equipment	• Oscilloscope, Two L.P.F.
• Measuring Points	• E, F, REFOUT
• Disc	• ABEX TCD-784
• Mode	• TEST MODE



• **Checking Procedure**

1. In test mode, load the disc and switch the 5V regulator on.
2. Using the **FWD** and **REV** buttons, move the PU unit to the innermost track.
3. Press key **B** to close focus, the display should read "91". Press key **D** to implement the tracking balance adjustment the display should now read "81". Press key **B** 4 times. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

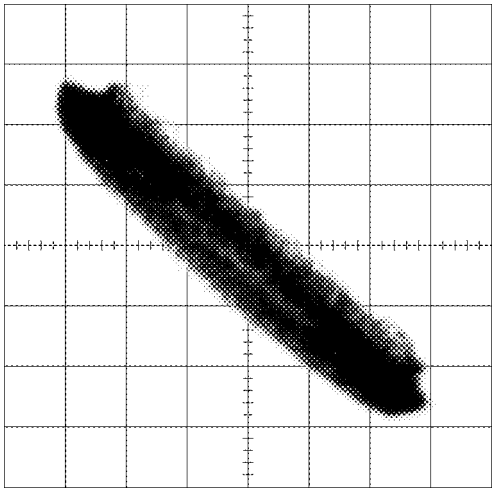
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

• **Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

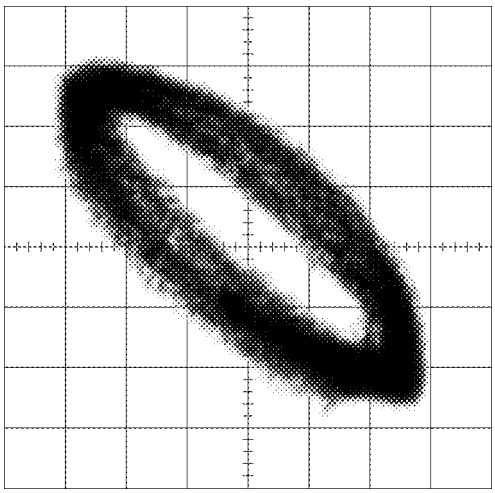
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

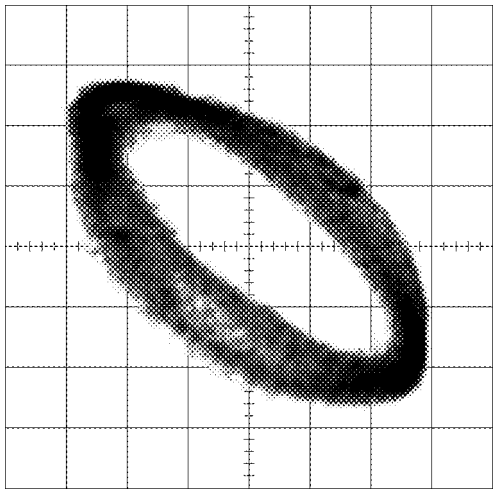
0°



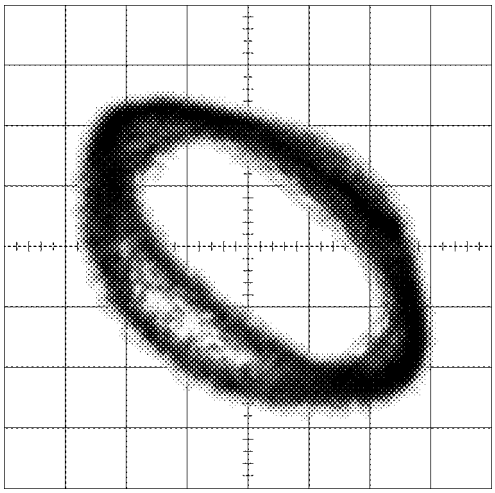
30°



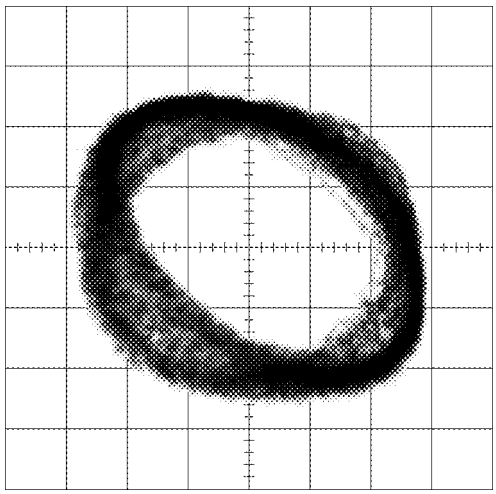
45°



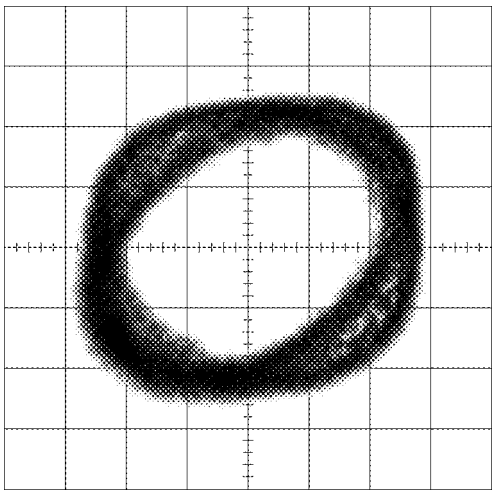
60°



75°



90°



7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 TEST MODE

● CD Test Mode

1) Precautions on Adjustment

- The unit employs a single voltage (+5V) for the regulator, thus the reference potential of the signal is RFOUT (approximately 2.5V) rather than GND.
  Inadvertent contact of REFOUT and GND during adjustment can result not only in disabling normal potential measurement but also in exposing the pick-up to strong impacts due to malfunctioning of the servo. Therefore, you are requested to observe the following precautions.
- Make sure that the negative probe of the measuring instrument is not connected to RFOUT or GND. Special care must be exercised so that the channel 1 negative probe may not be connected to the oscilloscope and the channel 2 negative probe to GND. Since the frame of the measuring instrument is usually at the same potential as the negative probe, the frame of the measuring instrument must be changed to floating status.
  When RFOUT is inadvertently connected to GND, you must immediately turn off the regulator or power supply.
- The regulator must be turned off before mounting or dismounting filters or wiring materials.
- You should not start adjustment or measurement immediately after the regulator is turned on. It is recommended to run the player for approximately one minute so that it may stabilize.
- When the test mode is turned on, various protective functions from the software become unavailable. Thus, you must make sure that undesirable electric or mechanical shocks are not be given to the system.
- This model employs a photo-transistor for detecting discs at their loading or ejection. Thus, if its outer case is removed during repair work and internal parts are exposed to light of strong intensity, malfunctions including the following can result:
  * The eject button becomes inoperable during play. Pressing the eject button does not eject a disc and play is continued.
  * Loading becomes unavailable.

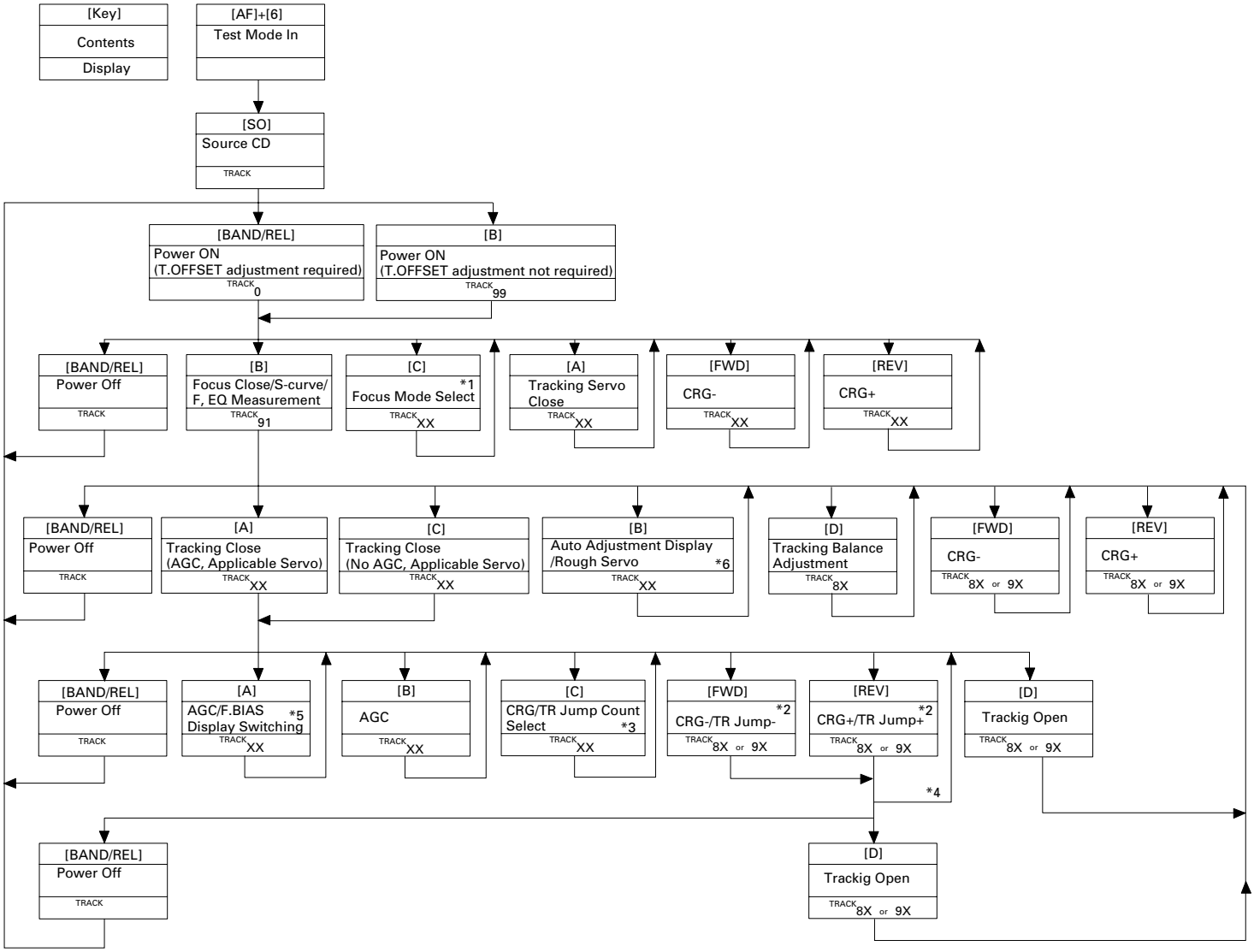
  If a malfunction is recognized, appropriate remedial actions must be taken. Such actions include changing the light source position, changing the unit position and applying a cover to the photo-transistor.
- When you press the [EJECT] key to eject a disc, you must not touch any other key until the ejection is complete.
- If you press the [FWD] or [REV] for the focus search in the test mode, you must turn the power off immediately. (Otherwise, the lens will be forced to stick to the top or bottom, potentially resulting in the burning of the actuator.)

2) Description of the Test Mode

Adjustment of this unit is done in parallel with the CD control unit (KEH-M9100ZRN/EW), thus key operations for adjustments are done from the unit. Taking the example of the KEH-M9100ZRN/EW, the following describes how to turn on the test mode and operate the keys. The keys referred to in the following are those used on the KEH-M9100ZRN/EW.

- Turning on the Test Mode
  Press the [AF] and [6] keys simultaneously to turn on the ACC and the backup.
- Ending the Test Mode
  When ACC or Back up is off, the test mode is canceled.
- Operation of TR JUMPs (except 100TR) continues after your finger has left the key. CRG MOVE and 100TR JUMP are forced to the tracking close mode as soon as the key is released.
- Turning the power on or off resets the JUMP MODE to the Single TR.

● CD Player Flowchart



*1) Switching must take place in the following sequence.

99 : Focus Close → 1 : S.Curve Check → 2 : Focus EQ Measurement.

*2) Single TR /4TR / 10TR / 32TR / 100TR

*3) Switching must take place in the following sequence.

Single TR → 4 TR → 10 TR → 32 TR → 100 TR → CRG Move
9X(8X):91(81) 92(82) 93(83) 94(84) 95(85) 96(86)

*4) It applies to the CRG Move and 100TR Jump alone.

*5) Switching must take place in the following sequence.

Min/Sec (or Track No.) → F.AGC Gain → F.AGC Gain → F. BIAS Setting

(AGC Gain = (Current value/Initial value) x 20)

*6) Switching must take place in the following sequence.

F.Cancel Display → T.Offset Display → T.Bal Display → Rough Servo.

(F.Bias value, F.Cancel value, T.Offset value, T.Bal value
= (Upper 8 bits of the setting (7F[H] to 80[H] + 80[H])/4
= 63[D] to 32[D] to 00[D]).

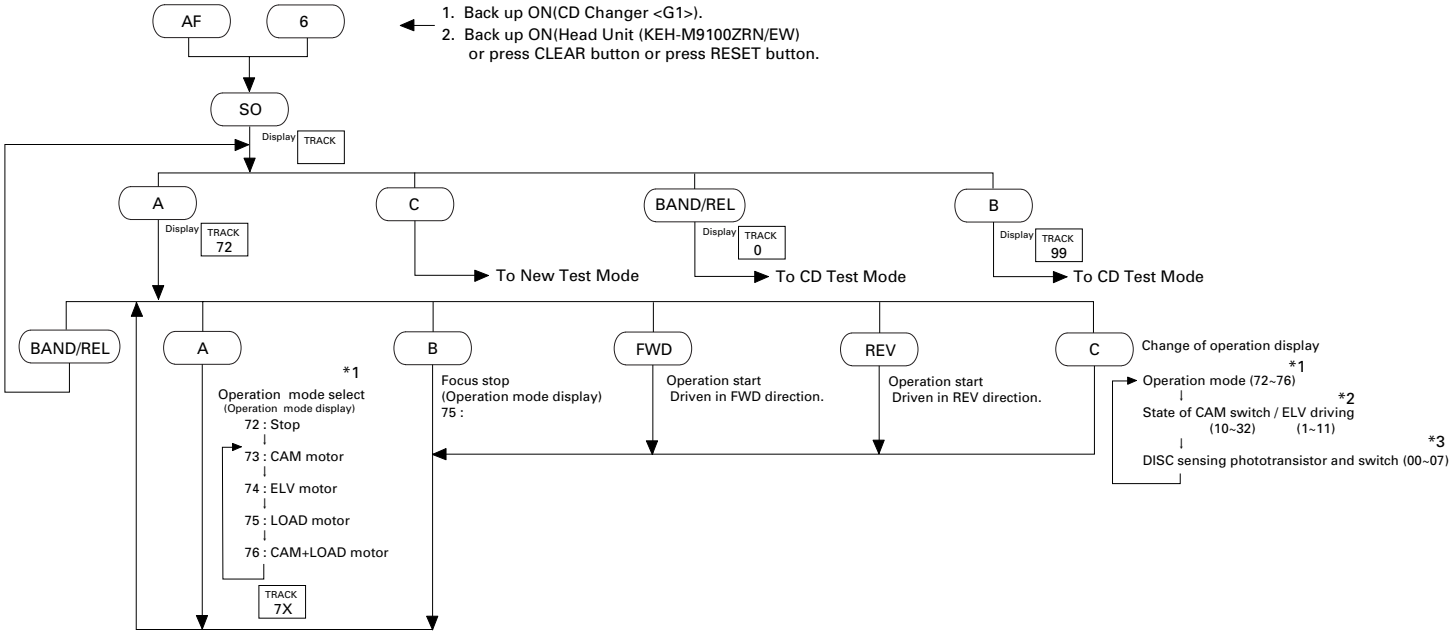
[Key]	Operation
[BAND/REL]	Power ON/OFF
[REV]	CRG+/TR Jump+ (Toward outer perimeter)
[FWD]	CRG-/TR Jump- (Toward inner perimeter)
[A]	Tracking Close/AGC gain, F.Bias adjustment value display switching
[B]	Focus Close, S.Curve, F.EQ measurement/ Rough Servo/AGC
[C]	Focus Mode select/Tracking Close/ CRG,TR Jump Switching
[D]	Auto Tracking Balance adjustment/ Tracking Open

- Operation of TR JUMPs other than 100TR is continued after your finger has left the key.
  CRG Move and 100TR Jump are forced to the Tracking Close Mode when the key is released.
- Powering on or off resets the Jump Mode to the Single TR (91).
- When ACC or Back up is off, the test mode is canceled.

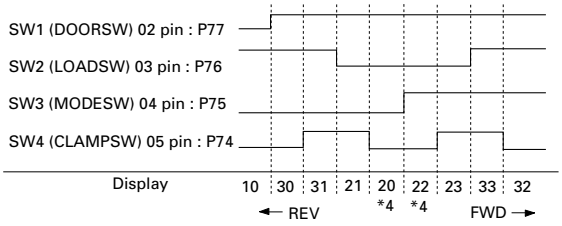
Note: Sound is unavailable even after the tracking has been closed
(this trouble results when the IC for the STS is not controlled in the test mode).

Note: When you pressed the [FWD] or [REV] key during the Focus Search, you must turn the power off immediately
(otherwise, the lens can stick resulting in actuator damages).

● CD Changer Mechanism Flowchart



Indicates CAMSW (CAM gear) status. *2


SW1 (DOORSW) 02 pin : P77
SW2 (LOADSW) 03 pin : P76
SW3 (MODESW) 04 pin : P75
SW4 (CLAMPSW) 05 pin : P74
Display
10 30 31 21 20 22 23 33 32
← REV
*4 *4
FWD →

State of DISC sensing phototransistor and switch *3

PH1 : 76pin : P65
PH2 : 77pin : P64
MAXSW : 78pin : P63

PH1	PH2	MAXSW	Display
L	L	L	00
H	L	L	01
L	H	L	02
H	H	L	03
L	L	H	04
H	L	H	05
L	H	H	06
H	H	H	07

L: Phototransistor is OPEN and switch is ON.
H: Phototransistor is CLOSE and switch is OFF.

● Precautions

*4 Before performing the elevation, make sure that the CAM SW (switch) is set to a position between 22 and 20.
As a rule, driving of the ELV MOTOR must be started immediately after the CAMSW indication has changed from 22 to 20.

When driving the CAM MOTOR in 31 → 30 → 10 (in REV direction), the elevation position must be at the EJECT/LOAD position (the top position).

● Operating Procedures for Ejecting a Clamped Disc

① Select CAM MOTOR[73] , then press the REV direction while the disc is being clamped (CAMSW state is 32).
The CAMSW status indication sequentially changes through 32→33→23→22.
② When the disc to be ejected is not identical with the disc being clamped, select the ELV MOTOR[74] in the vicinity of where the display changes from 22 to 20, then match the elevation to the disc to be ejected according to the following procedures:
After selecting ELV MOTOR[74], lower the elevation until the ELV position display becomes 01 (1st disc) using the REV direction.
Drive the elevation up until the display is changed to 10. This is the elevation where the second disk is situated.
The next display of 10 tells you the elevation of the 3rd disc. Repeating this operation allows you to establish an elevation matching each disc. (When the elevation is driven from the 1st through 6th disc, the status display changes as 01→11→10→11→10→11→10→11→10→11→10.)
(When the disc to be ejected coincides with the disc being clamped, the above operations are not necessary.)
③ Select the CAM MOTOR [73] and then, using the REV direction, drive it until the display changes from 20 (or 22) to 21 and 31.
④ Select the ELV MOTOR [74], then drive the tray of the disc to be ejected up to the EJECT/LOAD position (using the FWD direction).
⑤ Select the CAM+LOAD MOTOR [76], then drive it in the REV direction until the display changes from 31 to 30 and 10.
The door will open immediately before the display changes to 10 and part of the disc will be pushed out.
⑥ When 10 is displayed, select the LOAD MOTOR [75], then drive it in REV direction until the disc is completely ejected.

● New Test Mode

In the new test mode, the CD player plays as same as in the normal mode.
After setup, it displays error data such as out-of-focus, spindle unlocked, sub-code unreadable, and sound skipping together with causes, error-occurred time and disc No.
During setup, the operation status of the CD control software (the internal RAM: CPOINT) is displayed.
These functions and displayed data will help the efficiency in the service activities of aging test and failure analysis.

(1) Entering the new test mode

See the test mode flow chart on Page.49

(2) Key function table

Key	Test mode		New test mode	
	Regulator Off	Regulator On	In-play	Error/Protection
BAND	To regulator on	To regulator off	–	Time/Err.No. switching
FWD	–	FWD-Kick	FF/TR+	–
REV	–	REV-Kick	REV/TR-	–
A	–	Tracking close	Scan	–
D		Tracking open	Mode	
B	–	Focus close	–	–
–	–	Focus open	–	–
–	–	Jump off	–	–
C	To New test mode	Jump mode select	Auto/Manual	Track No./Time switching

(3) Error Codes and causes

Code	Category	The Contents of errors	Causes
10	Electricity	Off focus detected.	FOK remains low for 100 msec. → Damages/stains on disc, vibrations or failure on servo.
11	Electricity	Spindle unlocked.	FOK = Low continued for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
42	Electricity	Sub-code unreadable.	Sub-code was unreadable for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
43	Electricity	Sound skipping detected.	Last address memory function was activated. → Damages/stains on disc, vibrations or failure on servo.

Note: The error codes should be indicated in the same way as in the normal mode.

(4) Display of Operational Status (CPOINT) during Setup

Status No.	Contents	Status No.	Contents
01	C.HOME INNER START	02	DURING CARRIAGE INNER
03	DURING CARRIAGE OUTER	04	CARRIAGE HOME END
05	DURING CARRIAGE OUTER FOR RETRY	11	START SETUP
12	SP KICK AND FOCUS SEARCH START	13	XSI=L WAIT
14	FOK=H WAIT	15	FOK=H WAIT
16	ROUGH AGC	17	RADIAL KICK
18	TRACKING BALANCE AUTO CONTROL	19	TRACKING CLOSE
1A	TRACKING CLOSE WAIT FAGC/CRG CLOSE JUNC	1B	BEFORE FOCUS AGC CONTROL
1C	FOCUS AGC	1D	TRACKING AGC
1E	MIRR, LOCK, SUBCODE CHECK	1F	TEST MODE WAIT
20	SUPPORT JUNC	21	SPINDLE SPEED 1→2
22	MIRR, LOCK, SUBCODE CHECK Part 2	31	TRACKING OPEN
32	CARRIAGE SHIFT	33	WAIT TRACKING OPEN
34	START CARRIAGE MOVE	35	CARRIAGE BRAKE
36	TRACKING BRAKE ON	37	TRACKING BRAKE OFF
38	SPINDLE ROUGH SERVO	41	TRACKING KICK
42	SINGLE JUMP	43	4TRACK JUMP
44	10TRACK JUMP	45	32TRACK JUMP
4D	32TRACK JUMP	4E	32TRACK JUMP
4F	32TRACK JUMP		

(5) Display Examples

① During Setup (In case of 6-digit display and CPOINT=11H)

TRK No. MINUTE SECOND
11 11 11

(In case of 4-digit display, AUTO, and CPOINT=11H)

TRK No.
11

(In case of 4-digit display, MANU, and CPOINT= 1H)

MINUTE SECOND
11 11

② During Operation (TOC read, TRK search, Play, FF and REV)

The same as in the normal mode.

③ When a protection / Error occurred

Ⓐ Error display (Use the BAND key to switch to (B) or (C).)

8-digit display : ERROR-XX
6-digit display : ERR-XX
: Err-XX
4-digit display : E-XX

Ⓑ Track No. error-occurred (Use the BAND key to switch to (C).)

6 or more-digit display : TRACK MINUTE SECOND
10 40 05
4-digit display : TRACK
10

Ⓒ Absolute time error-occurred (Use the BAND key to switch to (B).)

6 or more- digit display (the same as in the Track No. display mode)
: TRACK MINUTE SECOND
10 40 05
4-digit display, Manual: MINUTE SECOND
10 05

(6) P-BUS data format

① During Setup

ADDRESS	NUMBER	ATATUS	MODE	NUMBER	MINUUTE	SEC	TRACK	STEP	BitDATA1	BitDATA2
61	09		FD							

Disc No. Value(CPOINT)

②-Ⓐ Error display

ADDRESS	NUMBER	ATATUS	MODE	NUMBER	MINUUTE	SEC	TRACK	STEP	BitDATA1	BitDATA2
61	09		FD				FF			

Disc No. Error code

③-Ⓑ Track No. display

ADDRESS	NUMBER	ATATUS	MODE	NUMBER	MINUUTE	SEC	TRACK	STEP	BitDATA1	BitDATA2
61	09		FD							

Disc No Time error occurred Track No.

③-Ⓒ Absolute time display

ADDRESS	NUMBER	ATATUS	MODE	NUMBER	MINUUTE	SEC	TRACK	STEP	BitDATA1	BitDATA2
61	09		FD							

Disc No. Absolute time Track No.

● Mechanism Test Mode

In this mode, operation tests such as elevation and tray-drawing /-pushing operation should be performed.

(1) Entering the mechanism test mode

See the test mode flow chart on page 50.

(2) Key function table

Key	Test mode		Mech. test mode
	Regulator Off	Regulator On	
BAND	To regulator on	To regulator off	To regulator off
FWD	–	FWD-Kick	Driven in FWD direction
REV	–	REV-Kick	Driven in REV direction
A	To Mech.test mode	Tracking close	Operation mode selection 72:Stop 73:CAM 74:ELV 75:LOAD 76:CAM+LOAD
D		Tracking open	–
B	–	Focus close	Focus stop (75:LOAD)
–	–	Focus open	–
–	–	Jump off	–
C	To New.test mode	Jump mode select	Operation display change Operation mode Display (72~76) ↓ CAM Switch Display (10~32) ↓ Disc-sense photoswitch display (00~07)

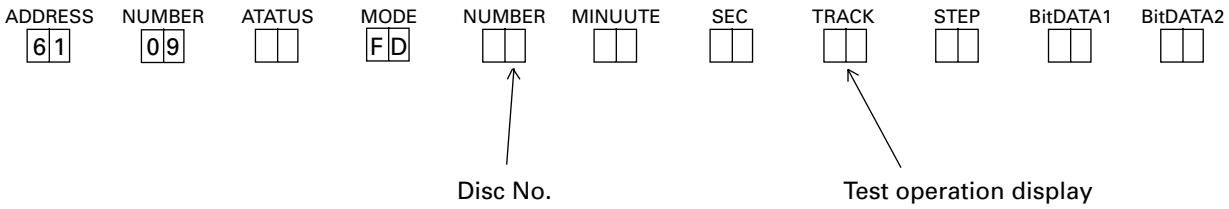
(3) Display Examples

1) 6-digit display, 73:CAM TRACK
73

2) 4-digit display, 73:CAM TRACK
73

(4) P-BUS data format

1) 6-digit display, 73:CAM



7.1.2 DISASSEMBLY

● Removing the upper case (not shown)

1. Remove the five screws, then remove the upper case.

● Removing the Extension Unit (Fig. 1)

1. Remove the two screws B, then remove the side frame .
2. Remove screw C, screw D and PCB from the connector.
3. Straighten the three currently bent claws, then remove the extension unit.

● Removing the Grille (Fig. 1)

1. Remove the two screws A and the connector, then remove the grille.

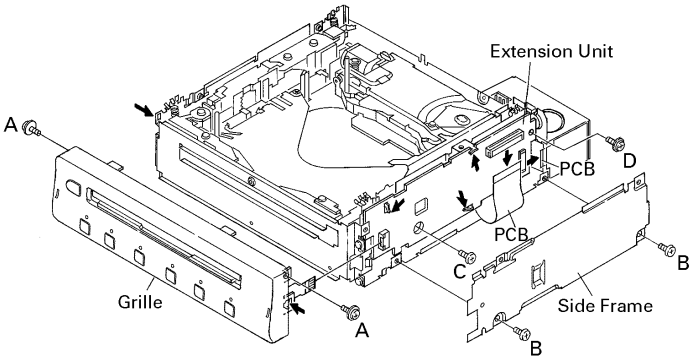


Fig. 1

● Removing the CD Mechanism Module (Fig. 2)

1. Remove the three screws A, then remove the front frame.
2. Remove the three screws B and two screws C, then remove the damper and holder.
3. Remove the two spring Ⓐs, spring Ⓑ and spring Ⓒ from the hook, then remove the CD mechanism module.

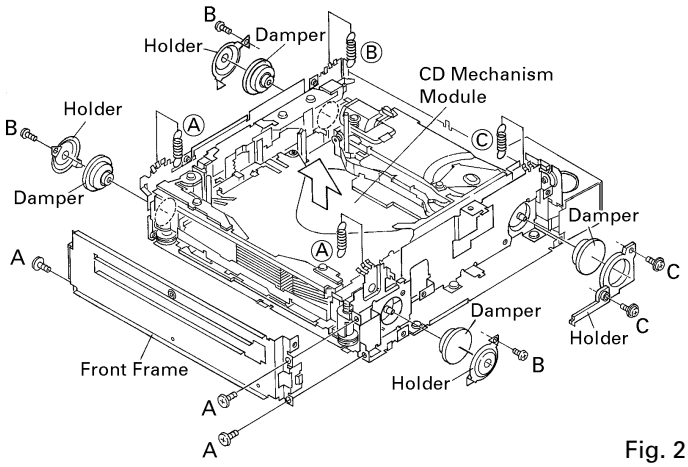


Fig. 2

– Precautions on Assembly –

Apply spring Ⓒ (black) to the front side hook.

Remaining springs Ⓐ and Ⓑ are to be hung on the center hook.

● Removing the Keyboard Unit (Fig. 3)

1. Remove the four screws B and, screw A then remove the keyboard Unit.
2. Remove the four screws C, then remove the holder.

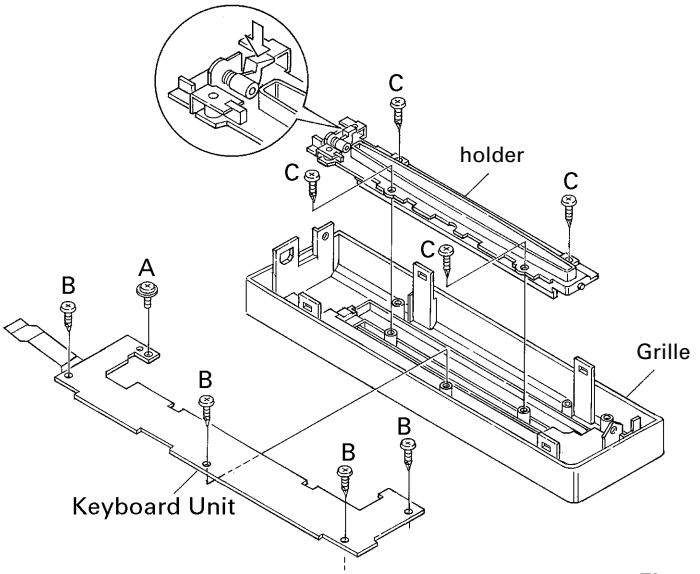


Fig. 3

● How to remove the Tray Assy

1. Apply about 6V current to the Cam gear motor until all holes match at the position (A) (elevation OK position).
2. Hook the three springs B temporarily as shown in Fig. 5. While pushing the Tray holder lock arms (right and left) in the direction (C), remove the Tray holder.
3. Lift up the Tray assy to remove it.

* Be careful not to remove the Tray hooks from the Tray assy.

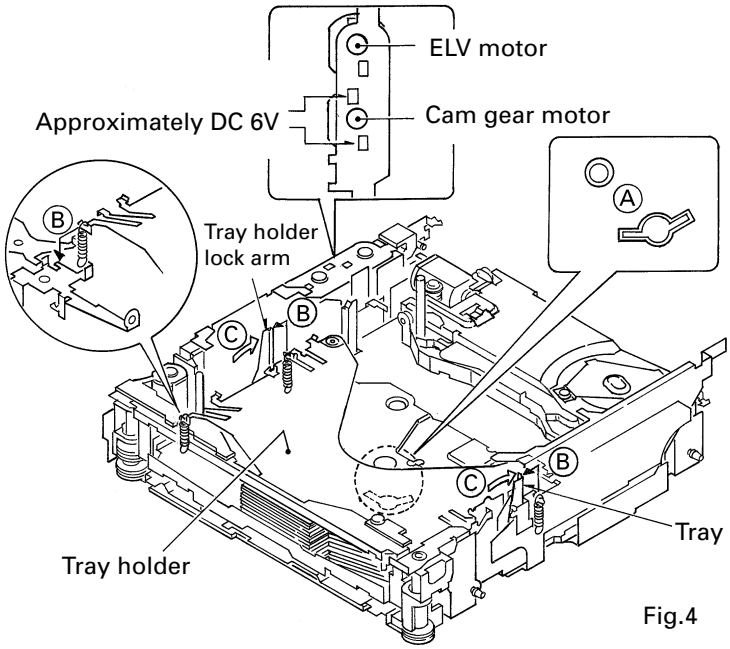


Fig.4

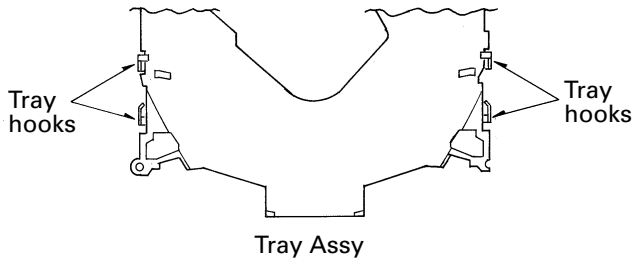


Fig. 5

● How to remove the Carriage Mech. Assy

1. Insert a short pin into the flexible PCB of the Pickup unit.
2. While opening the resin hooks, remove the cover from the Servo unit.
3. Disconnect the flexible PCBs from the connectors CN101 and CN301.
4. Remove the Tray holder and the Tray assy. (See above)
5. Rotate the Cam gear motor until the positions of all holes (E) match, then stop the motor.
   (The Carriage Mech assy will stop as shown in the Fig.7.)

* When the positions of all holes match, they will be completely covered by the Carriage mech assy.

* To rotate the Cam Gear motor, see "How to remove the Tray assy".

6. Unhook the spring A.
7. Remove the flexible holder B (while opening the hooks).
8. Remove the flexible PCB (C) from the motor. (The flexible PCB (C) has been stuck on the motor with double-sided adhesive tape.)
9. Loosen the fixing screw and remove the flexible holder.

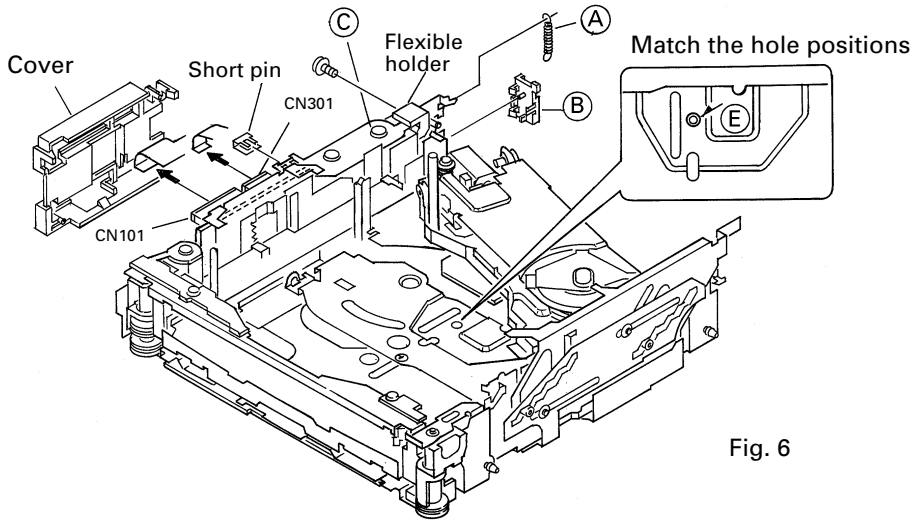


Fig. 6

10. Remove the screw, pressure spring and collar. Lift up the Carriage mechanism assy to remove it.
    * Screw tightening torque: 2.6kgfcm

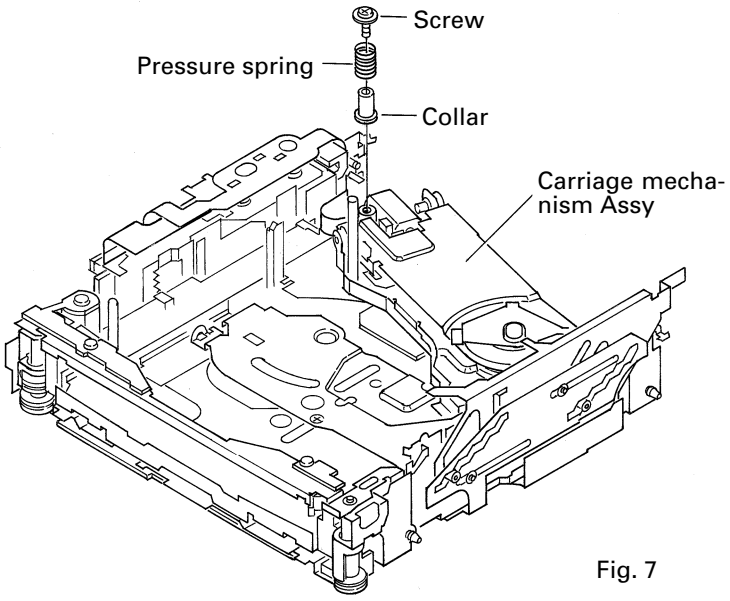


Fig. 7

● **How to remove the Pickup unit**

1. Remove the pulling spring, torsion spring and E-shaped ring. Then remove the Clamper arm.

* The spring (A) will be removed with the Clamper arm.

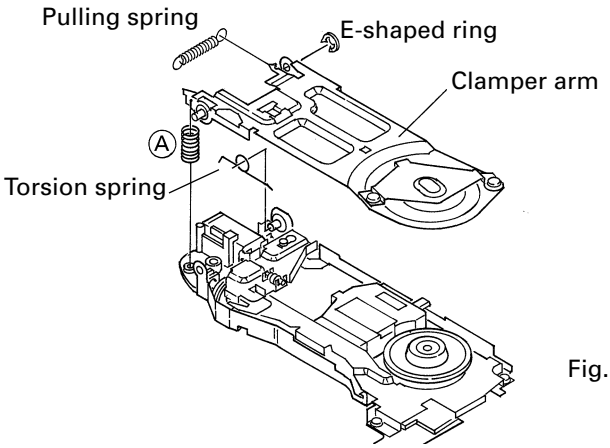


Fig. 8

2. Slide the Clamp UP lever (B) to remove it.
3. Loosen the 2 screws. Remove the feed-screw cover by sliding it.
4. Remove the feed-screw pressure spring (D).
5. Loosen the 2 screws. Remove the feed-screw holder (E).
6. Remove the belt.
7. Remove the Pickup unit together with the feed screw.

* Be careful not to lose the shaft holders at the both ends of the feed screw.
* Be careful not to damage the 2 flexible PCBs(for the Pickup and motor) when separating them. The flexible PCBs have been stuck each other with double-sided adhesive tape.

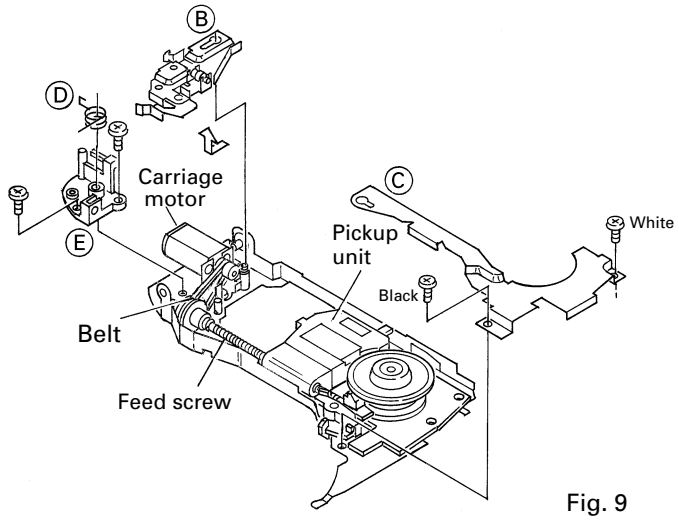


Fig. 9

8. Loosen the 2 screws. Remove the plate spring and the rack.
9. Pull out the feed screw from the Pickup unit.

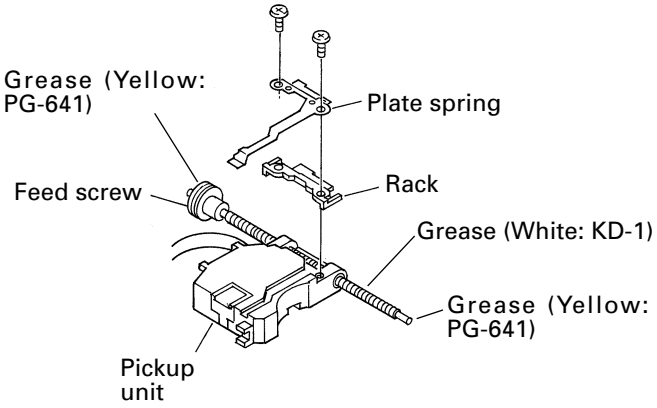
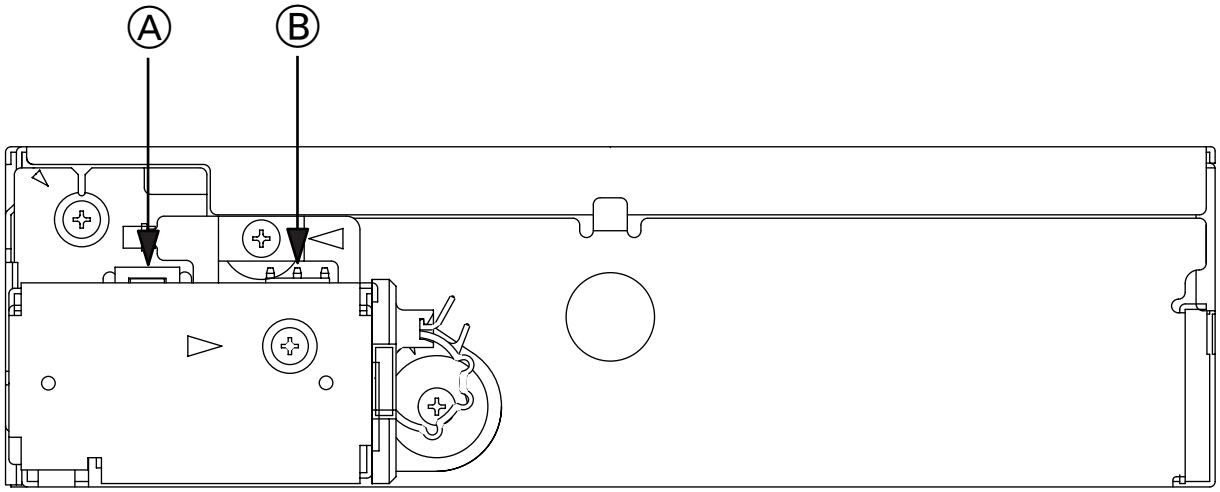


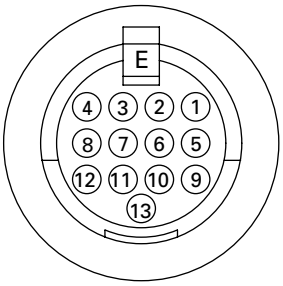
Fig. 10

7.1.3 CONNECTOR FUNCTION DESCRIPTION



Ⓐ

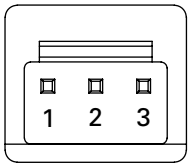
P-BUS CONNECTOR (DIN 13pins)



1	AUDIO GND
2	Lch
3	AUDIO GND
4	Rch
5	Lch SHIELD
6	Rch SHIELD
7	NC
8	GND
9	SRQ
10	RST
11	RXEN
12	SCK
13	DATA
E	SHIELD GND

Ⓑ

POWER CONNECTOR (3pins)



1	GND
2	ILL
3	B.UP

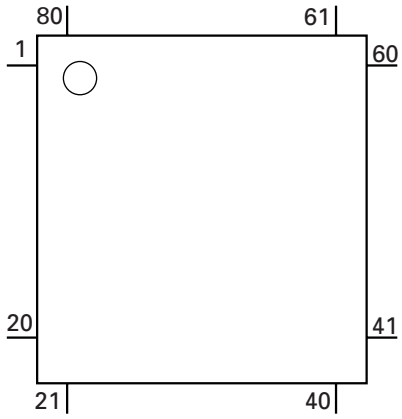
7.2 IC

● **Pin Functions (PD5553A)**

Pin No.	Pin Name	I/O	Function and Operation
1	VDIN	I	VD power supply sensor input
2	DOORSW	I	Door open position sense input
3	LOADSW	I	Loading sense input
4	MODESW	I	Elevation OK input
5	CLAMPSW	I	Disk clamp sense input
6	ELHOME	I	Elevation reset input
7	XSCK	O	LSI clock output
8	XSO	O	LSI data output
9	XSI	I	LSI data input
10	$\overline{\text{XSTB}}$	O	LSI strobe output
11	$\overline{\text{XRST}}$	O	LSI reset output
12	XA0	O	LSI data discernment control signal output
13	VDCONT	O	VD power supply control output
14	EJKEY	I	Eject key input
15	NC		Not used
16	$\overline{\text{BRST}}$	I	P-BUS reset input
17	$\overline{\text{BSRQ}}$	O	P-BUS service request input
18	$\overline{\text{ERXEN}}$	I/O	P-BUS busy input/output
19	$\overline{\text{BSCK}}$	I/O	P-BUS clock input/output
20	$\overline{\text{BSO}}$	O	P-BUS data output
21	$\overline{\text{BSI}}$	I	P-BUS data input
22	$\overline{\text{BSENS}}$	I	Back up power sense input
23	BSCY	I	Signal indicating head of subcode block input
24	CNV55		GND
25	$\overline{\text{RESET}}$	I	Reset input
26	POWER	O	Servo / Mechanism power supply control output
27	CONT	O	Servo driver power supply control output
28	XIN	I	Crystal oscillating element connection pin
29	XOUT	O	Crystal oscillating element connection pin
30	VSS		GND
31–33	KST1-3	O	Key strobe output
34,35	$\overline{\text{KDT1,2}}$	I	Key data input
36,37	NC		Not used
38	$\overline{\text{ADENA}}$	O	A/D converter reference voltage output
39	$\overline{\text{TESTIN}}$	I	Test program mode input
40	DCLOSE	I	Door close sense input
41	WDSL	O	Data comparison designation output
42	XWIH	I	DRAM data white inhibit input
43	XEMP	I	DRAM data read inhibit input
44	CHDT	I	Data comparison mode monitor input
45,46	CHM0,1	O	Data comparison mode output
47-49	NC		Not used
50	$\overline{\text{XWRE}}$	O	DRAM data white enable output L:enable
51	$\overline{\text{XRDE}}$	O	DRAM data read enable output L:enable
52	$\overline{\text{XQOK}}$	O	SUB-Q OK output L:SUBQ OK
53	EMPH	O	DAC EMPH output
54	SCONT	O	Double speed select output
55	LOAD	O	PHOT power supply control output
56	CDMUTE	O	CD mute output
57,58	LO2,1	O	Load motor control output
59,60	ELV2,1	O	ELV motor control output
61,62	CG2,1	O	CAM motor control output
63	MIRR	I	Mirror detector input
64	LOCK	I	Spindle lock detector input
65	FOK	I	Focus OK signal input
66	EXSCK	O	Shift clock output

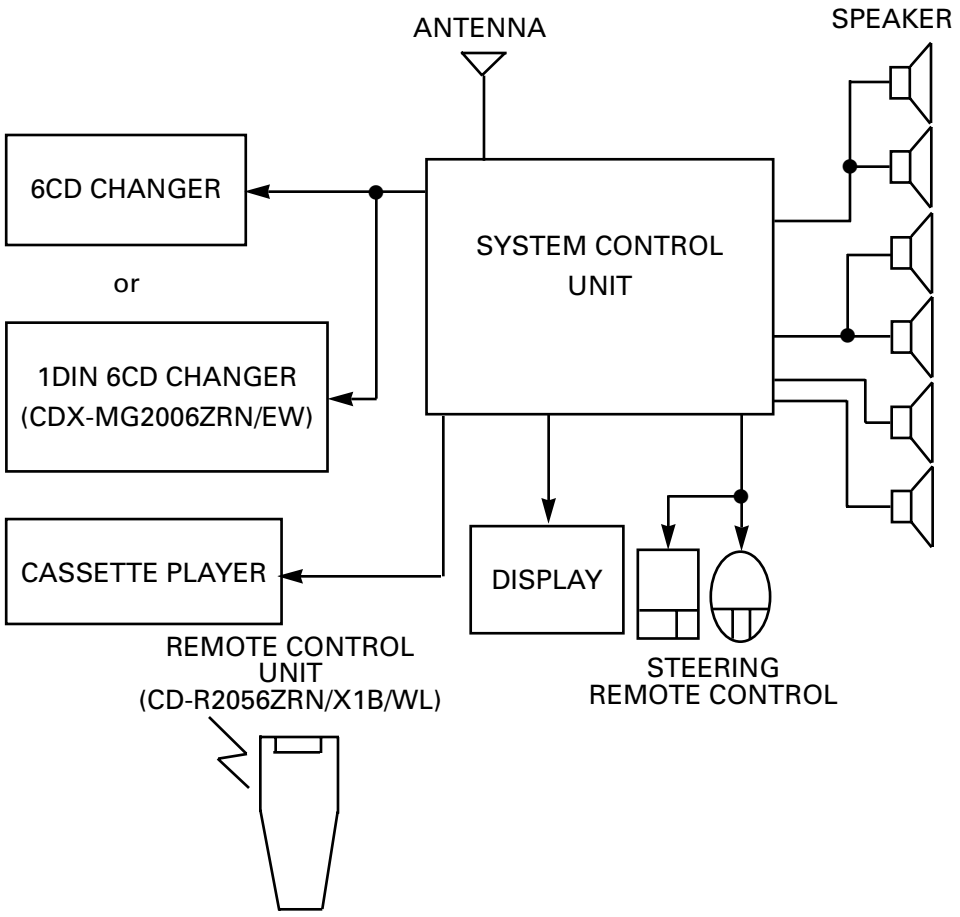
Pin No.	Pin Name	I/O	Function and Operation
67	EXMODE	O	Latch clock output
68	EXSO	O	Serial data output
69	EXCE	O	Chip enable output
70	ILPOW	O	Illumination indicator control output
71	VCC		VDD
72	VREF	I	A/D converter reference voltage input
73	AVSS	I	A/D converter GND
74	ADRMON	I	DRAM memory remaining monitor input
75	EREF	I	DRAM A/D converter reference voltage input
76,77	PH1-3	I	Disc photo sense input
78	MAXSW	I	Maxi CD discernment sense input
79	ELVSNS	I	ELV position sense input
80	TEMP	I	Temperature detector input

*PD5553A



IC's marked by* are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

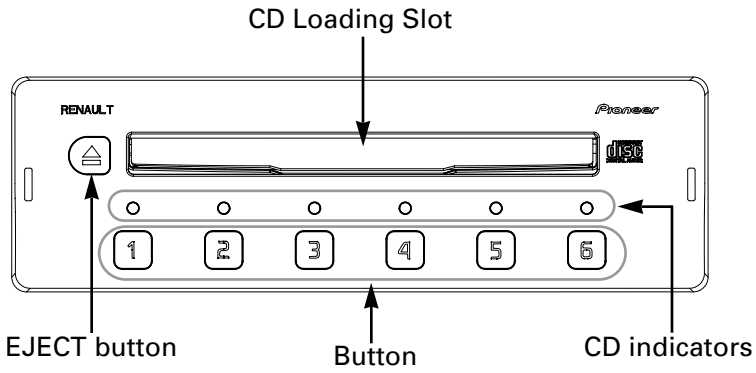
7.3 SYSTEM BLOCK DIAGRAM



8. OPERATIONS AND SPECIFICATIONS

8.1 OPERATIONS

Key Finder



8.2 SPECIFICATIONS

General

Power source ..... 14.4 V DC (10.5 – 16.0 V allowable)
Grounding system ..... Negative type
Standby current ..... 2 mA
Dimensions (chassis size) .... 177.8 (W) × 50 (H) × 160 (D) mm
Weight ..... 1.55 kg

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16;linear
Frequency characteristics ..... 20 – 20,000 Hz
Signal-to-noise ratio ..... 92 dB (1kHz) (IHF-A network)
Dynamic range ..... 92 dB (1kHz)
Number of channels ..... 2 (stereo)

Service Manual

ORDER NO.
CRT2376

CD MECHANISM MODULE

CX-890

NOTE:

- **This Service Manual outlines operations of the CD mechanism module used in the models listed blow.**
- **For repair, use this Service Manual and the Service Manual of the model used in the system.**

Model	Service manual	CD mechanism module	CD mechanism unit
CDX-PD6/UC	CRT2372	CXK4701	CXB2700

CONTENTS

1. MAIN PARTS LOCATIONS.....2
2. CIRCUIT DESCRIPTIONS.....3
3. MECHANISM OPERATIONS.....16
4. DISASSEMBLY.....21

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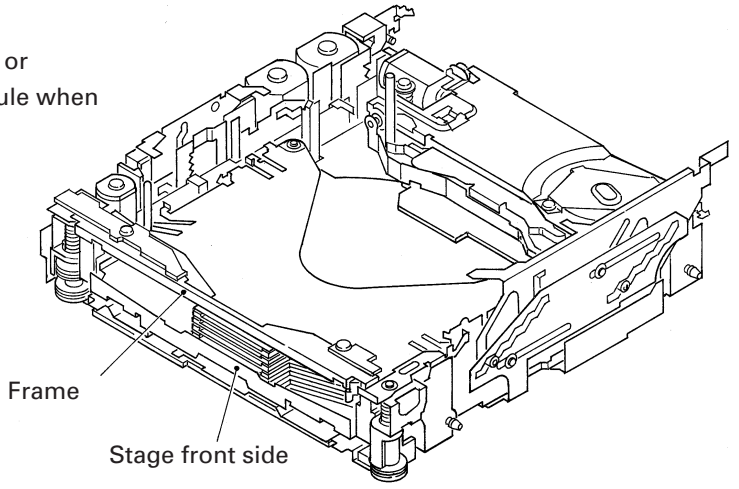
● **CD Player Service Precautions**

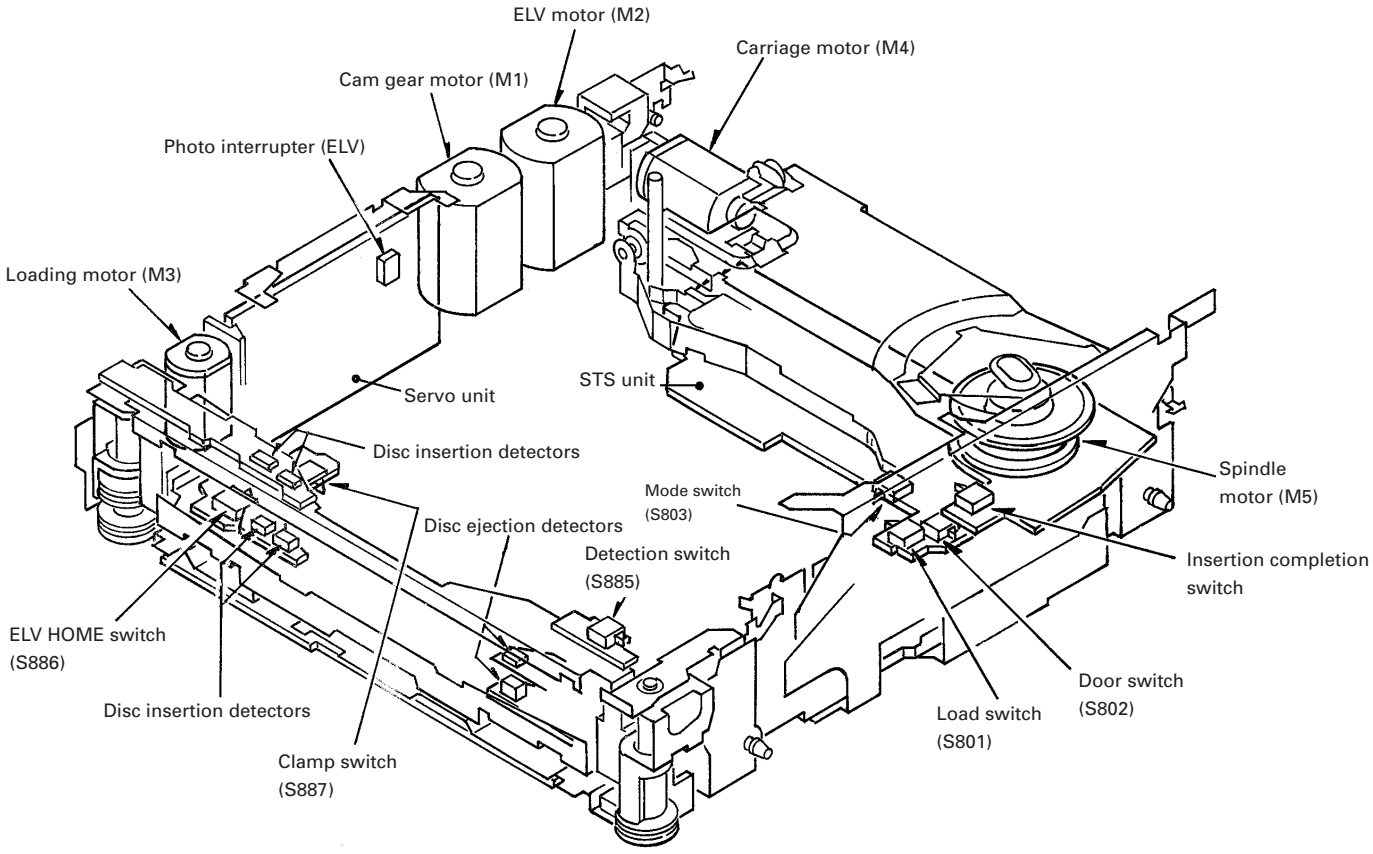
1. For pickup unit(CXX1311) handling, please refer to"Disassembly"(Page 21).
   During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).

Do not hold the upper frame of the disc insertion slot or the front side of the stage in the CD mechanism module when servicing to prevent them from being deformed.

2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.



1. MAIN PARTS LOCATIONS



2. CIRCUIT DESCRIPTIONS

2.1 Preamplifier (UPC2572GS: IC101)

The preamplifier processes pickup output signals to generate signals to be sent to the servo, demodulator, and controller. The preamplifier with built-in photodetector converts signals from the pickup into intermediate voltage in the pickup. Then, addition is made in the RF amplifier (IC101) to obtain RF, FE, TE, and TE zero cross signals. The system consists of the UPC2572GS and other components explained below. The system uses a single power source (+5 V). Therefore, the reference voltage of IC101 and the reference voltage of the power unit and servo circuit are REFOUT (+2.5 V). REFOUT is obtained from REFOUT of servo LSI (IC201: UPD63702GF) via a buffer, and is output from Pin 19 of IC101. This REFOUT is used as reference for all measurements.

Note:Do NOT short-circuit REFOUT and GND during measurement.

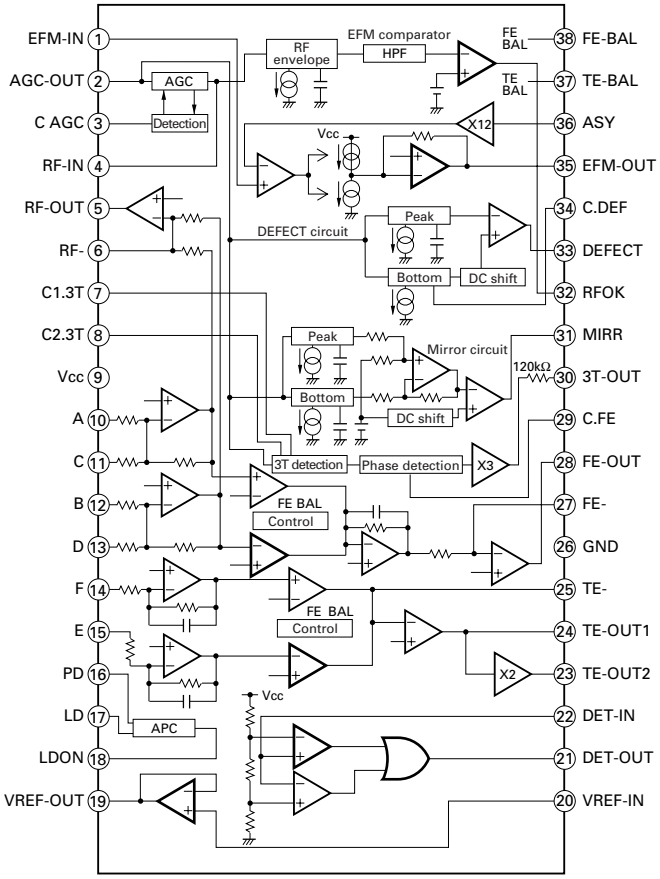


Fig. 1 Block Diagram of UPC2572GS

1) Automatic Power Control (APC) circuit

Laser diode has negative temperature characteristics with great optical output when the diode is driven with constant current. Therefore, current must be controlled by a monitor diode to ensure constant output. Thus functions the APC circuit. LD current can be obtained by measuring the voltage between LD1 and GND. The current value is approximately 35 mA.

$$\text{LD current(mA)} = \frac{\text{Voltage between LD1 and GND(mv)}}{10\ \Omega + 12\ \Omega}$$

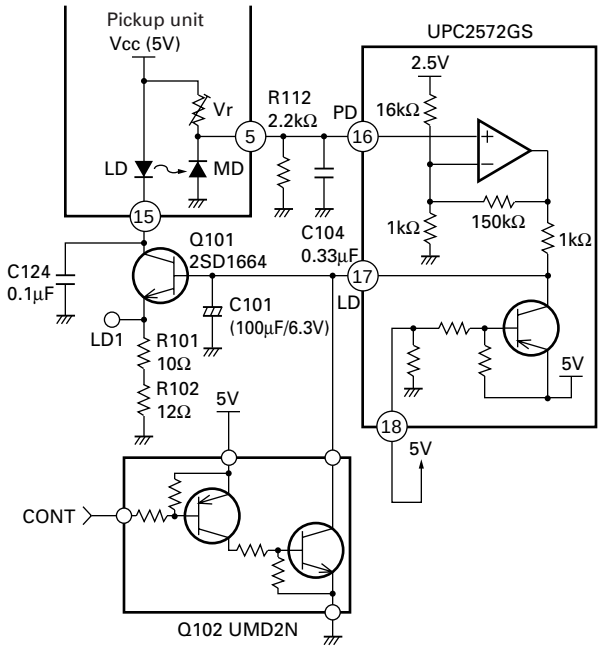


Fig. 2 APC Circuit

2) RF amplifier and RF AGC amplifier

Photodetector outputs (A+C) and (B+D) are added, amplified and equalized in IC101, and output to the RFI terminal as RF signal. (Eye pattern can be checked at this terminal.)

Low-frequency components of voltage RFI is:

$$RFI = ((A + C) + (B + D)) \times 3.22$$

where R111 is offset resistor to keep RFI signal within the output range of the preamplifier. RFI signal is goes under AC coupling, and is input to Pin 4 (RFIN terminal).

IC101 contains an RF AGC circuit. RFO output from Pin 2 is maintained to a constant level (1.2 ±0.2 Vp-p). The RFO signal is used in the EFM, DFCT, and MIRR circuits.

3) EFM circuit

The EFM circuit converts RF signal into digital signals of "0" and "1". RFO signal after AC coupling is input to Pin 1, and supplied to the EFM circuit.

Asymmetry caused during manufacturing of discs cannot be eliminated solely by AC coupling. Therefore, the system controls the reference voltage ASY of the EFM comparator by using the fact that probability to generate "0" and "1" is 50% in EFM signal. This reference voltage ASY is generated by output from the EFM comparator through L.P.F. EFM signal is output from Pin 35. As signal level, amplification is 2.5 Vp-p around REFOUT.

4) DFCT (defect) circuit

DFCT signal detects mirror defect in discs, and is output from Pin 33. The system outputs "H" when a mirror defect is detected.

If disc is soiled, the system determines it as lack of mirror. Therefore, the system inputs the DFCT signal output to the HOLD terminal of servo LSI. Focus and tracking servo drives change to Hold status only when DFCT output is in "H" so that performance of the system upon detection of defect can be improved.

5) RFOK circuit

The RFOK circuit outputs signal to show the timing of focus closing servo, as well as the status of focus closing during playback. The signal is output from Pin 32. The system inputs the RFOK signal output to the RFOK terminal of servo LSI. The servo LSI issues Focus Close command. The system outputs signal in "H" during focus closing and playback.

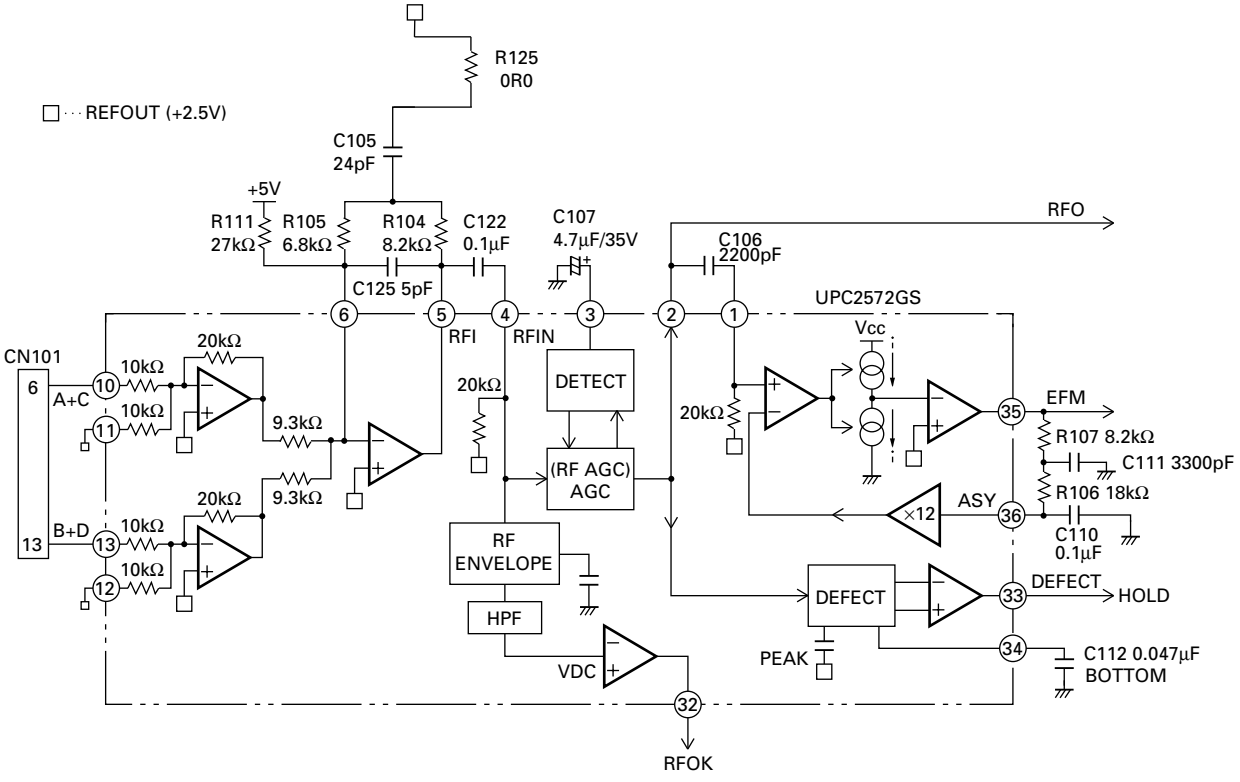


Fig. 3 RF AMP, RF AGC, EFM, DFCT, RFOK Circuit

6) Focus-error amplifier

The system outputs photodetector output (A+C) and (B+D) as FE signal (A+C)-(B+D) from Pin 28 via the difference amplifier, then via the error amplifier.

Low-frequency components of voltage FEY is:

$$FEY=(A+C)-(B+D)\times\frac{20k\Omega}{10k\Omega}\times\frac{90k\Omega}{68.8k\Omega}\times\frac{R108}{17.2k\Omega}$$

: (FE level of pickup unit x 5.02)

An S curve equivalent to approximately 1.6 Vp-p is obtained at FE output (Pin 28) by using REFO as reference. The cut-off frequency of the amplifier of the last layer is 12.4 kHz.

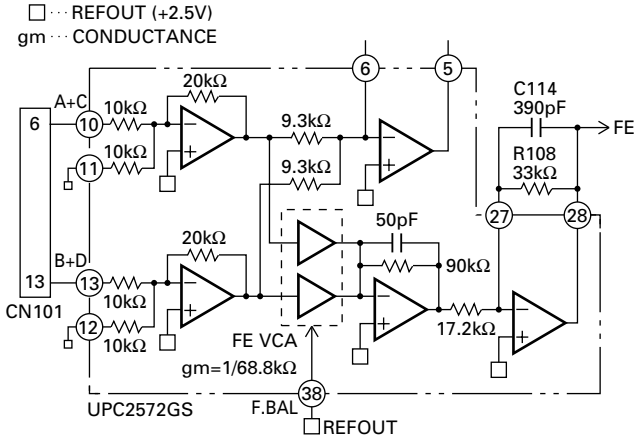


Fig. 4 Focus-error amplifier

7) Tracking-error amplifier

Outputs E and F from the photodetector are output as TE signal (E-F) from Pin 24 via the difference amplifier, then via the error amplifier.

Low-frequency components of voltage TEY is:

$$TEY=(E-F)\times\frac{63k\Omega}{(31k\Omega+16k\Omega)}\times\frac{68k\Omega}{17k\Omega}$$

: (TE level of pickup unit x 5.36)

TE waveforms equivalent to approximately 1.5 Vp-p are obtained at TE output (Pin 24) by using REFO as reference. The cut-off frequency of the amplifier of the last layer is 19.5 kHz.

8) Tracking zero-cross amplifier

Tracking zero-cross signal (TEC signal) is generated by amplifying TE waveforms (voltage at Pin 24) by a factor of four. The signal is used for detecting the zero-cross point of tracking error in the servo LSI UPD63702AGF. The purposes of detecting the zero-cross point are as follows:

(1)To be used for counting tracks for carriage move and track jump.

(2)To be used for detecting the direction of lens movement when tracking is closed. (To be used in the tracking brake circuit mentioned later.)

The frequency range of TEC signal is from 500 Hz to 19.5 kHz.

Voltage TEC = TE level x 4

In other words, the TEC signal level is calculated as 6 Vp-p. This level exceeds the D range of the operation amplifier, resulting in the signal to clip. However, there shall be no problem, since the servo LSI uses only zero-cross point.

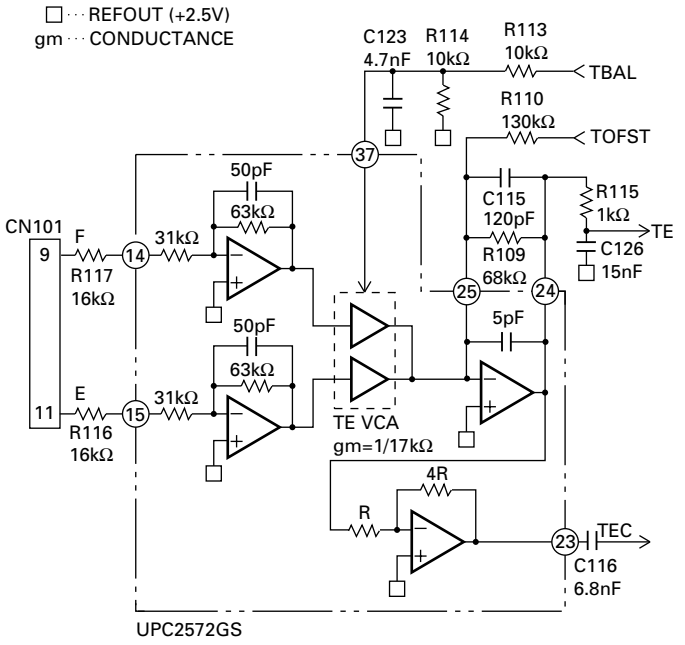


Fig. 5 Tracking-error amplifier, Tracking zero-cross amplifier

9) MIRR (mirror) circuit

MIRR signal shows ON and OFF track information. The signal is output from Pin 31.

The status of MIRR signal is as follows:

Laser beam ON track: MIRR = "L"

Laser beam OFF track: MIRR = "H"

The signal is used in the brake circuit mentioned later.

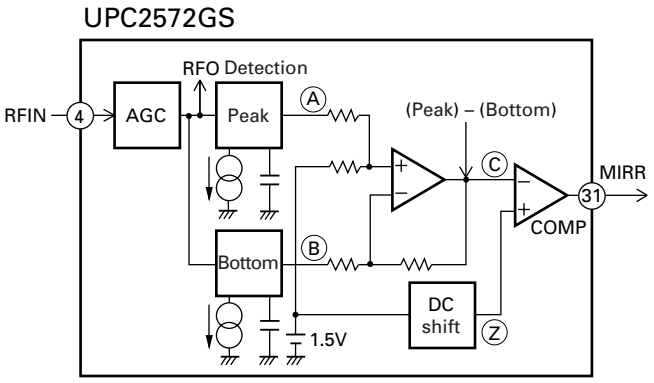


Fig.6 MIRR Circuit

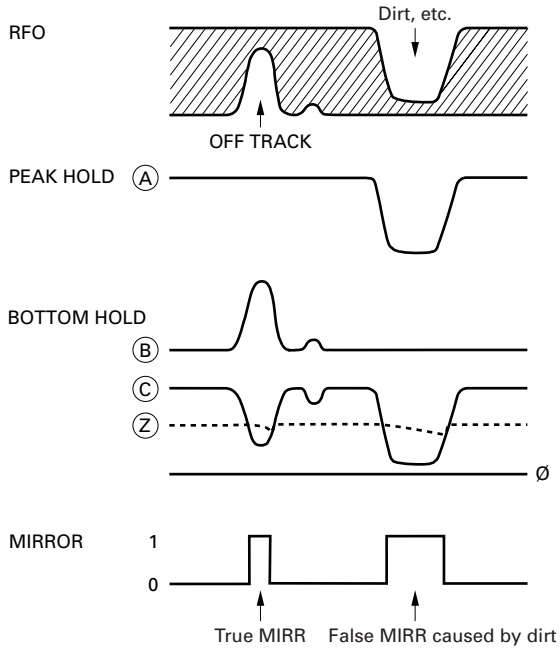


Fig. 7 MIRR Circuit

10) 3T OUT circuit

The system detects flickering of RF signal when disturbance is input to the focus servo loop, and outputs the difference of phase between FE signal and RF-level fluctuation signal from Pin 30. The resulting signal is obtained through L.P.F. with a fc of 40 Hz. This signal is used for automatic adjustment of FE bias.

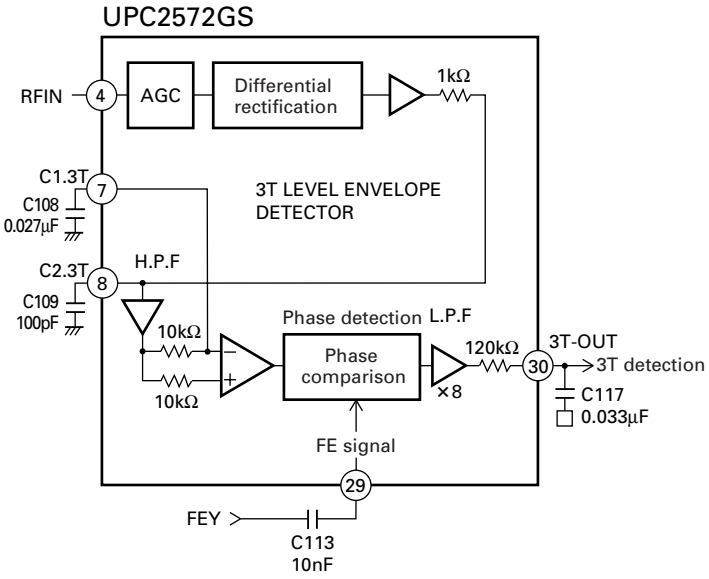


Fig. 8 3T OUT Circuit

2.2 Servo (UPD63702AGF: IC201)

The servo consists of mainly two parts. The first part is the servo processing unit to equalize error signals and control track jump, carriage move, in focus, etc. The second part is the signal processing unit to perform data decoding, error correction, and interpolation.
The system converts FE and TE signals from analog to digital in IC201, then outputs drive signals of the focus, tracking, and carriage systems via the servo block. The EFM signal input from the preamplifier is decoded by the signal processing unit, and eventually output as audio signal after conversion into analog from digital signals via the DA converter (IC201 contains audio DAC). Then, the system generates error signal for the spindle servo in the decoding process, sends the signal to the spindle servo to generate drive signal for spindle.
After that, drive signals for focus, tracking, carriage, and spindle are amplified in IC301 and BA5986FM, and supplied to respective actuators and motors.

1) Focus servo system

The main equalizer of focus servo is located in the UPD63702AGF. Fig. 9 shows block diagram of the focus servo.
For the focus servo system, the lens must be positioned within the focusing range in order to perform focus closing. To achieve this, the system moves the lens upward/downward by focus-search voltage of triangular waveform to detect the focusing point. During searching, the system kicks the SPDL motor to maintain rotation speed to set speed.
The servo LSI monitors FE and RFOK signals so that focus closing is performed automatically at an appropriate point.
Focus closing is performed when the following four conditions are satisfied:
(1)When the lens moves nearer to the disc.
(2)RFOK = "H"
(3)FZD signal (in IC) is latched to "H"
(4)FE = 0 (REFOUT as reference)

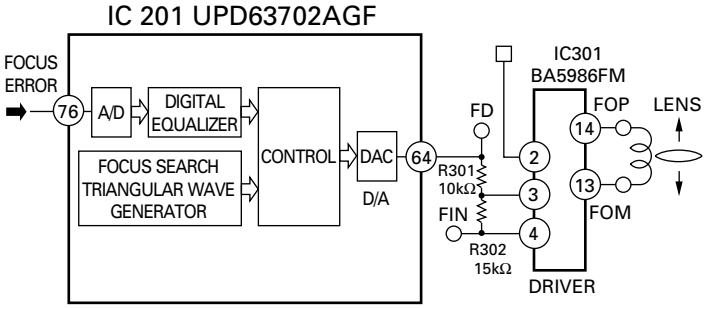


Fig. 9 Focus servo block diagram

When the conditions mentioned above are satisfied and focus is closed, the XSO terminal changes from "H" to "L". Then, the microcomputer starts monitoring RFOK signal through L.P.F after 40 ms.
If the system judges RFOK signal as "L", the microcomputer takes actions, including protection.
Fig. 10 shows operations related to focus closing. (The illustration shows when the system cannot perform focus closing.) S curve, search voltage, and actual lens behavior can be checked by pressing the Focus Close button when "01" is shown in Focus Mode Select in Test mode.

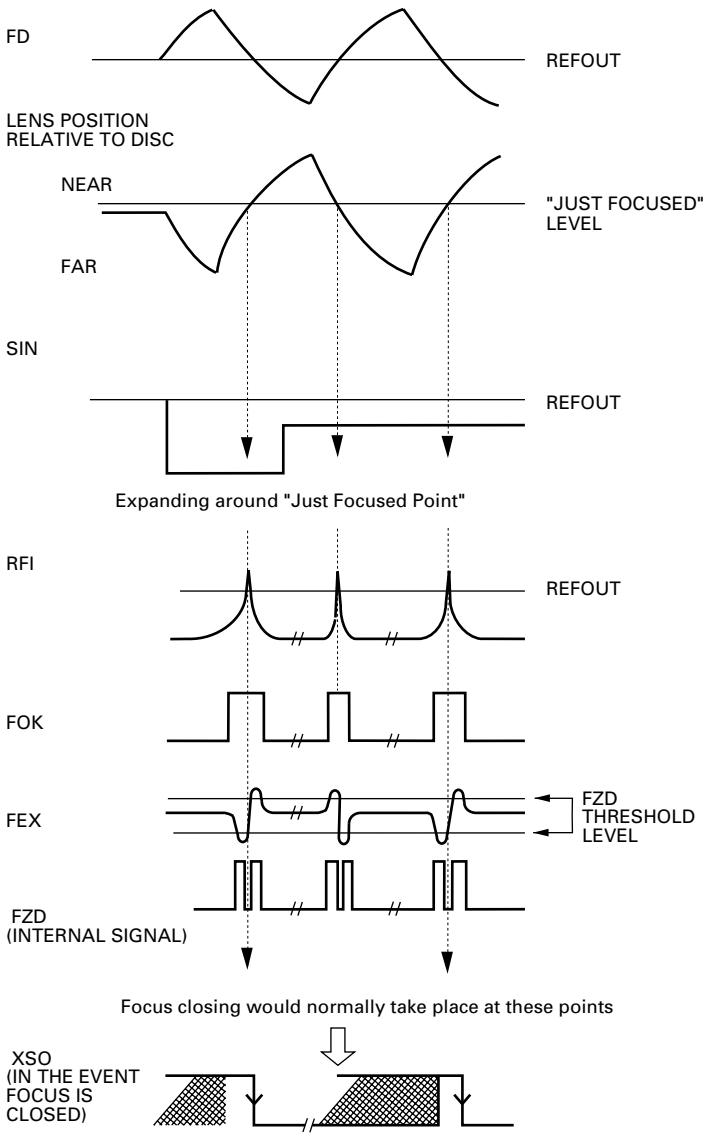


Fig. 10 Sequence of Focus Closing

2) Tracking servo system

The main equalizer of tracking servo is located in the UPD63702AGF. Fig. 11 shows block diagram of the tracking servo.

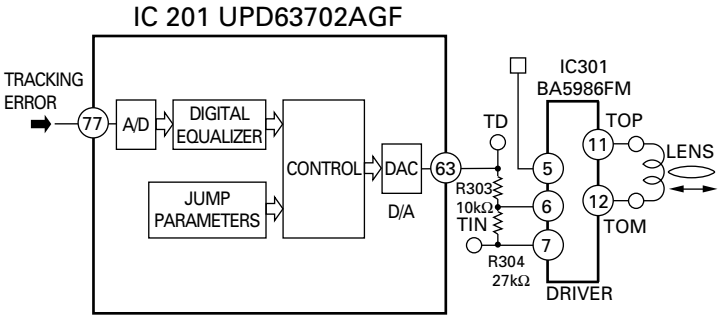


Fig. 11 Tracking servo block diagram

a) Track jump

Track jump is automatically performed by the auto sequence function in LSI when the LSI accepts command. The system has six types of jump (1, 4, 10, 32, 32x2, and 32x3) for truck jump during searching. In Test mode, the system can select and check these jump types and CRG move by selecting a mode. The microcomputer sets half of the total number of track jumps (two tracks if the total number of tracks are four), and counts the set number of tracks by using TEC signal.

The system outputs brake pulse for a specified time (set by the microcomputer) from the point of time when the set number is counted, and stops the lens. Thus, tracking is closed, and the system can continue normal playback.

To improve servo withdrawal during track jump, the system sets the brake circuit to ON for 60 ms after brake pulse so that gain of the tracking servo can be increased.

FF/REV in normal mode is made by continuously performing single jump approximately ten times faster than in normal playback.

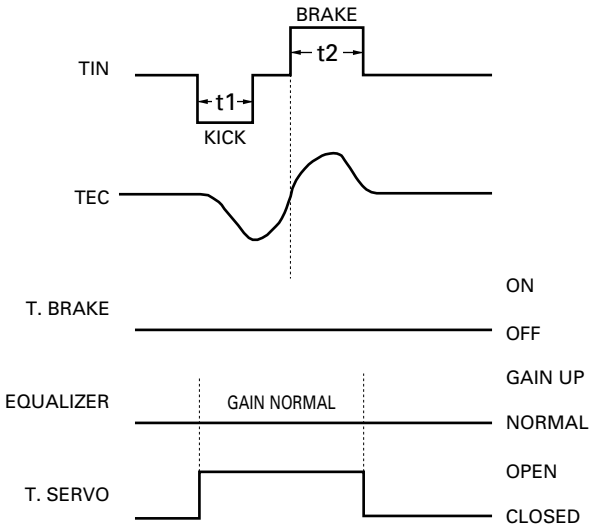


Fig. 12 Single track jump

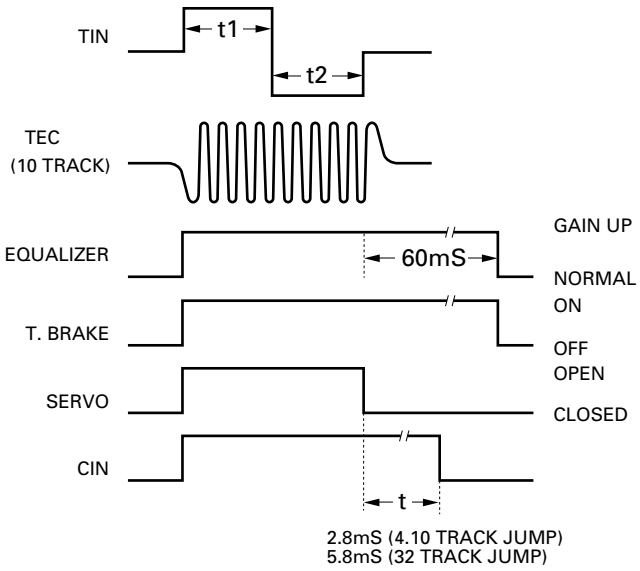
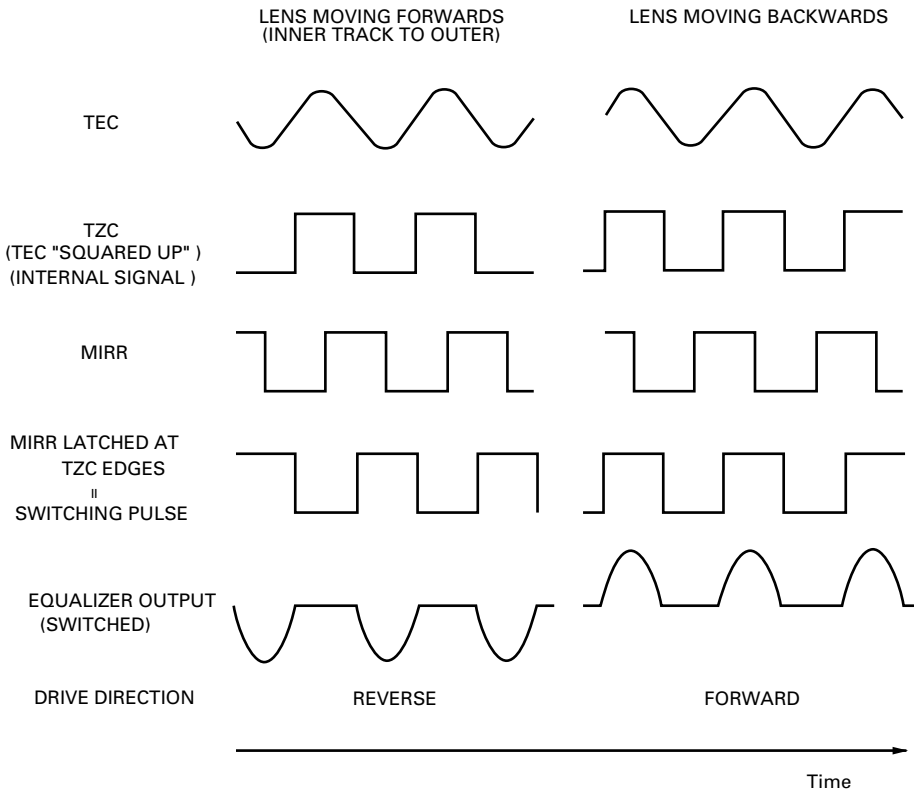


Fig. 13 Multi track jump

b) Brake circuit
Servo withdrawal will deteriorate during setting and track jump. Thus, the system uses the brake circuit to provide stable withdrawal to servo loop.
The brake circuit detects the direction of lens movement, and outputs only drive signal in the opposite direction from the lens movement. Thus, the system delays the speed of the lens movement to stabilize withdrawal of the tracking servo.
The system judges sliding direction of track from TEC and MIRR signals, as well as the relationship of their phase.



Note: In the illustration, the phase of equalizer output is shown as the same as with that of TEC.

Fig. 14 Tracking Brake Circuit

3) Carriage servo system

Output from low-frequency components (lens position information) of the tracking equalizer is input to the carriage equalizer by the carriage servo. After obtaining a certain gain, the system outputs drive signal from the servo LSI. The signal is then applied to the carriage motor via the driver IC. More specifically, the pickup unit as a whole must be moved forward when lens offset during playback reaches a specified level. Therefore, gain of equalizer is set so that voltage higher than the activation voltage of the carriage motor is output. As actual operation, a certain threshold level is set for equalizer output in the servo LSI, and drive voltage is output from the servo LSI only when the equalizer output level exceeds that level. Thus, power consumption is reduced. Depending on eccentricity, etc. of disc, the equalizer output voltage may cross the threshold level several times before the pickup unit as a whole starts operation. At this time, waveforms of drive voltage from LSI are output as pulse.

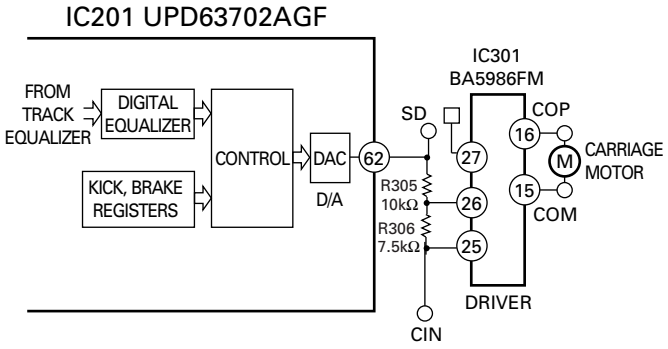


Fig. 15 Carriage Servo Circuit

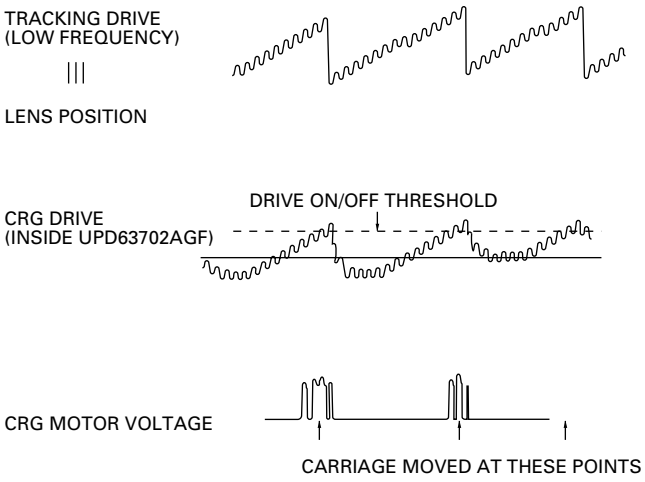


Fig. 16 Carriage Signal Waveforms

4) Spindle servo system

The spindle servo has the following modes:

(1)Kick mode:To be used for accelerating disc rotation during setting.

(2)Offset mode:

a)To be used after completion of kick until comple tion of spindle lock during setting.

b)If focus is out of range during playback, this mode is used until focus is recovered. In both cases, Offset mode is used for maintaining disc rotation to the speed close to specified rotation.

(3)Adaptive Servo mode: CLV servo mode during normal operation. The system samples every WFCK in 16 cycles whether frame synchronous signal matches output from the internal frame counter in EFM demodulation block, and generates signal that shows matching/unmatching status. If signal showing unmatching status continues for 8 times, the system deems it as asynchronous status. Except this case, the system judges as synchronous. In Adaptive Servo mode, the system automatically selects withdrawal servo for asynchronous status, and steady-state servo for synchronous status.

(4)Brake mode: Mode to stop the spindle motor. The microcomputer outputs brake voltage from the servo LSI. Waveforms of EFM are monitored inside the LSI. If the longest pattern of EFM exceeds specified intervals (if the rotation speed adequately slowed down), flag is activated in the LSI, and the microcomputer turns brake voltage to OFF. If no flag is activated after a specified time, the microcomputer changes from Brake to Stop mode. This status continues for a specified time. If the system changes to Stop mode during ejection, disc is ejected after the specified time mentioned above.

(5)Stop mode: To be used when the power is turned to ON, and during ejection. In Stop mode, the end-to-end voltage of the spindle motor is 0 V.

(6)Rough Servo mode: To be used when returning carriage (carriage move during long search, etc.). The system calculates linear speed from waveforms of EFM, and inputs either "H" or "L" level to the spindle equalizer. This mode is also used for confirmation of grating in Test mode.

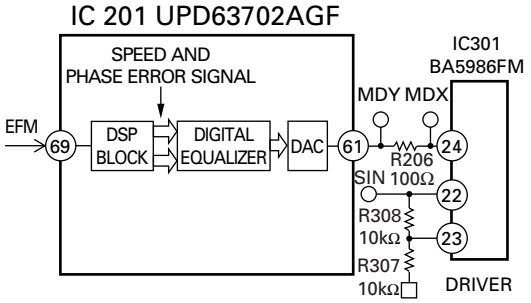


Fig. 17 Spindle servo block diagram

2.3 Automatic Adjustment Function

With this system, all circuit adjustments are automatically performed by using the preamplifier (UPC2572GS) and servo LSI (UPD63702AGF). All adjustments are automatically performed whenever disc is inserted or CD mode is selected by the Source key. Details of automatic adjustments are as follows:

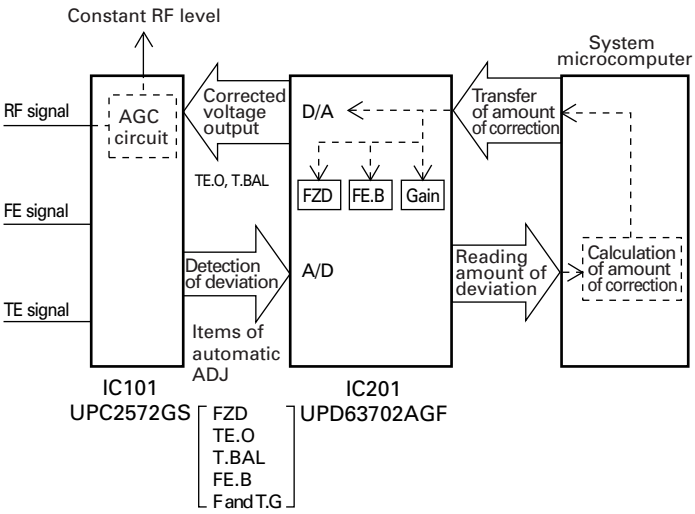


Fig. 18 Outline of Automatic Adjustment

1) Setting of FZD cancellation

This setting ensures focus closing. The system reads the FE offset level when the power is turned to ON, then writes the inverse voltage of offset value of that level to CRAM inside IC to cancel offset. Thus, the threshold level of FZD can be set to a constant value (+150 mV). As a result, "Latching FZD signal to H", which is one of the conditions required for focus closing in IC, is ensured.

2) TE offset automatic adjustment

Adjusts TE amplifier offset of the preamplifier to 0 V when the power is turned to ON.

Adjustment is made as follows:

(1)The microcomputer reads TE offset in LD OFF status via the servo LSI (TE1).

(2)The microcomputer calculates the voltage to be corrected using the TE1 value, and outputs from Pin 65 (pin name: TOFST) of the servo LSI. More specifically, calculation is made as follows:

TOFST2 = TOFST1 + TE1 x R110 / R109

3) Tracking balance (T.BAL) automatic adjustment

To make the sensitivity of Ech of TE output equal to that of Fch. In fact, adjustment is made so that the upper and lower portions of TE waveforms are symmetric to REFOUT.

Adjustment is made in the following steps:

(1)After focus close, the system kicks the lens in the radial direction to ensure TE waveforms to be generated.

(2)The microcomputer reads the peak bottom of TE waveforms via the servo LSI.

(3)The microcomputer calculates the amount of offset, then calculates the voltage to be corrected based on that offset. The system outputs the result from Pin 66 (pin name: TBAL) of the servo LSI.

(4)The voltage output from the servo LSI is input to Pin 37 of the preamplifier (IC101: UPC2572GS). Pin 37 is a control-voltage terminal of the TEVCA amplifier. According to voltage input, the system changes gain of Ech and Fch in the preamplifier, and adjusts the tracking balance to make the upper and lower portions of TE waveforms symmetric to REFOUT.

4) FE bias automatic adjustment

Maximizes the RFI level by optimizing focus point during playback. Adjustment is made by using 3T level waveforms of RF waveforms and the phase difference generated by input of disturbance of focus error. Since adjustment is made by inputting disturbance to focus loop, the system uses the same timing as with auto gain control (mentioned later~) for adjustment.

Adjustment is made in the following steps:

(1)Disturbance is input to focus loop by the command from the microcomputer (inside the servo LSI).

(2)The system detects flickering of 3T components of RF signal in the preamplifier.

(3)The system checks the phase difference between 3T components mentioned above and FE signal caused by input of disturbance to detect the direction of focus deviation. The result is output as DC voltage from Pin 30 (3TOUT) of the preamplifier.

(4)The 3TOUT voltage is input to Pin 75 (A/D port) of the servo LSI. The microcomputer reads this 3TOUT voltage via the servo LSI.

(5)The microcomputer calculates the amount of correction required. The results are transferred to offset of focus loop in the servo LSI.

As with auto gain control, the system repeats the same adjustment process several times to improve adjustment precision.

5) Auto gain control (AGC)

AGC adjustment is already used in the CD modules of the previous generation. This function automatically adjusts servo loop gain of focus and tracking.
Adjustment is made in the following steps:

(1)Disturbance is input to servo loop.

(2)The system extracts error signals (FE and TE) upon input of disturbance via the B.P.F. and obtains signals of G1 and G2.

(3)The microcomputer reads G1 and G2 signals via the servo LSI.

(4)The microcomputer calculates required amount of correction to adjust loop gain in the servo LSI. The system repeats the same adjustment process several times to improve adjustment precision.

6) Initial adjustment value

For all automatic adjustments, the system uses the previous adjustment value as initial values, except when the power of the microcomputer has been turned to OFF (backup is turned to OFF). If backup has been turned to OFF, the system uses initial set value to perform automatic adjustment.

7) Display of coefficients of adjustment results

Results of automatic adjustments can be displayed in Test mode for confirmation. Display of coefficients in each automatic adjustment is as follows:

(1)FZD cancel, TE.OFST cancel, T.BAL, and FE bias
Reference = 32 (32: No adjustment was required)
Display is made in units of approximately 40 mV.
Example: Coefficient of FZD cancel = 35
35 - 32 = 3 3 x 40 mV = 120 mV
Corrected amount is approximately +120 mV.
Thus, FE offset before adjustment is -120 mV.

(2)Adjustment of F and T gain
Reference: Focus = 13, tracking = 20
The amount of reduced gain in comparison with the reference is known by looking at the coefficient dis played.
Example: AGC coefficient = 40
Amount of reduced gain = 20 log (20/40) = -6dB

2.4 Power Supply and Mechanism Control

The power supply VM (7.5V) is produced from the power supply VD (9.0V) supplied from the extension P.C. board, and used as the power supply for the loading motor driver, elevation motor driver, cam gear motor driver, and 5V Reg IC. As for the drive voltage for the disc detection LEDs and the power supply for the CD driver ICs, the power supply VD (9.0V) is used. The system IC controls the ON/OFF operations of the CD driver and laser diodes,the 5V power supply, and the drive voltage PVD for detection LEDs with "CONT", "POWER", and "LOAD" signals respectively.

2.5 STS(Sure Track System) Circuit

By pooling the musical data read in from a compact disc into the memory, even if the pickup should go off track for some reason, the Sure Track System enables prevention of sound interruption during recovery (approximately 3 seconds) by continuing to output data from the memory.

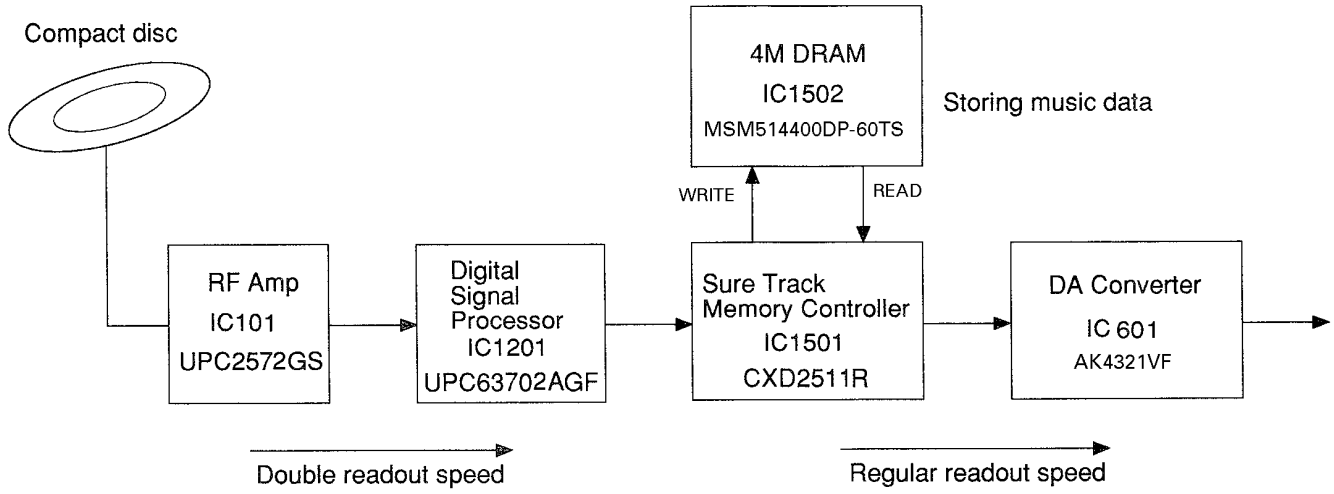


Fig. 19

Operation Principle

The STS circuit is controlled by the vibration free memory controller (CXD2511R). Data read in at double speed from a compact disc is input via the digital signal processing circuit into CXD2511R.

CXD2511R stores this DA data in DRAM (MSM5114400 DP-60TS), and reads and outputs the data at normal speed in synchronization with the internally generated FS system clock. In order to write the DA data at double speed and to read out at normal speed, the DRAM becomes full, but when it reaches capacity it will tentatively stop reading data. (The CD is in the pause mode during this time.) When an available area is created by data read-out from the DRAM, data writing will start again. (The available area of the DRAM can be monitored by ADRMON. By repeating this process, the DRAM is always used effectively, and approximately 2.67 seconds worth data can be stored. Even if the pickup should go off track due to vibrations for example, if recovered within 2.67 seconds while using the memorized data, sound interruption can be prevented.

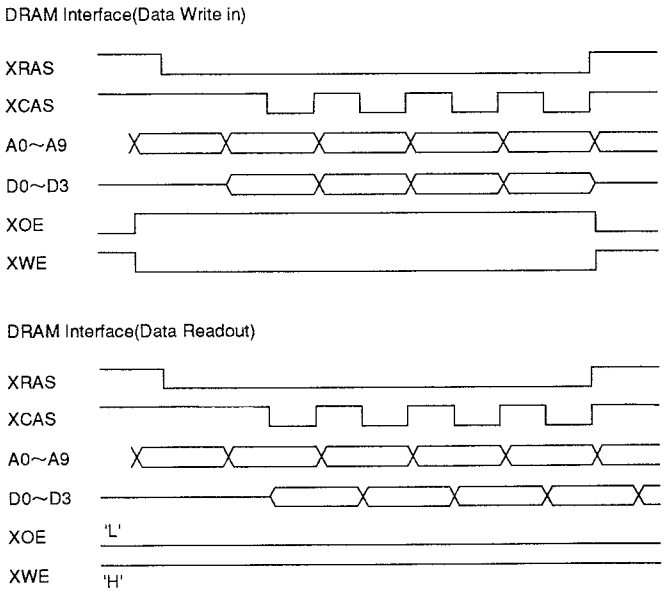


Fig. 20 TIMING CHART

3. MECHANISM OPERATIONS

3.1 Disc Insertion

a)The Cam gear rotates to the elevation OK position (See "How to remove the Tray Assy" on page 21). The Stage Mech Assy moves upwards or downwards to reach the height of the selected tray by using the elevation mechanism.

b)The Cam gear rotates counterclockwise until the LOAD switch is turned off. The Beak arms of the Stage Mech ASSY driven by the Cam gear's movement lift the selected tray.

c)The Stage Mech Assy with the tray lifted moves to the top position using the elevation mechanism.

* Disc insertion/ejection is performed at the top position (the 6th stage) irrespectively of tray position.

d)The Cam gear rotates counterclockwise to move the LOAD arms as shown in Fig.21.

e)The LOAD arms push the disc loaded on the tray and open the tray hooks.

f)When a disc is inserted, the disc interrupts the infrared LED light from the photo transistors, and the Rubber roller starts rotating.

* The photo transistors are connected in serial. When the light is interrupted from either photo-transistor, the start of disc insertion will be detected.

g)The disc is drawn in. Then the disc pushes the insertion completion switch via the arm.

h)The LOAD arms move forward to be released from the disc. At the same time, the tray hooks close to hold the disc on the tray.

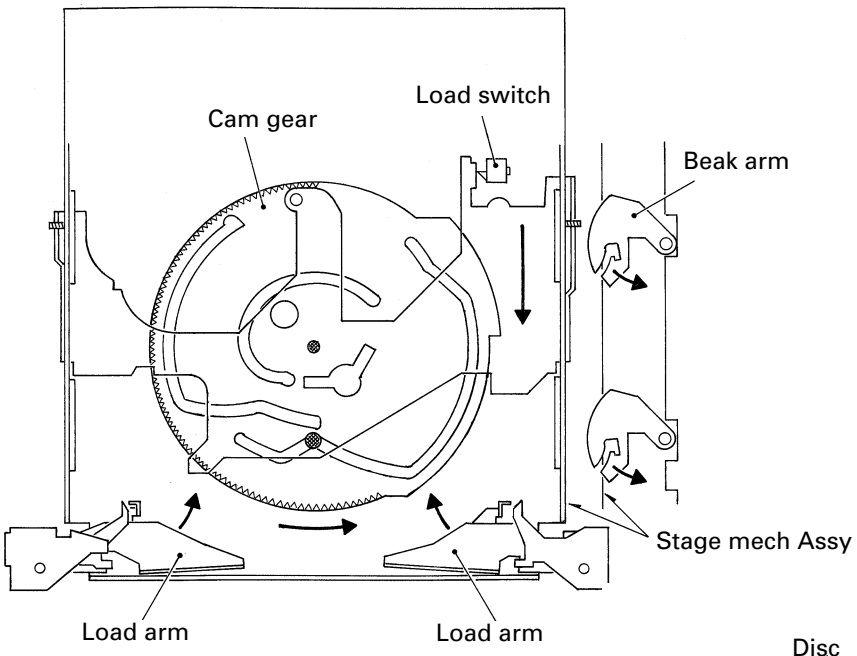


Fig. 21: Elevation OK position

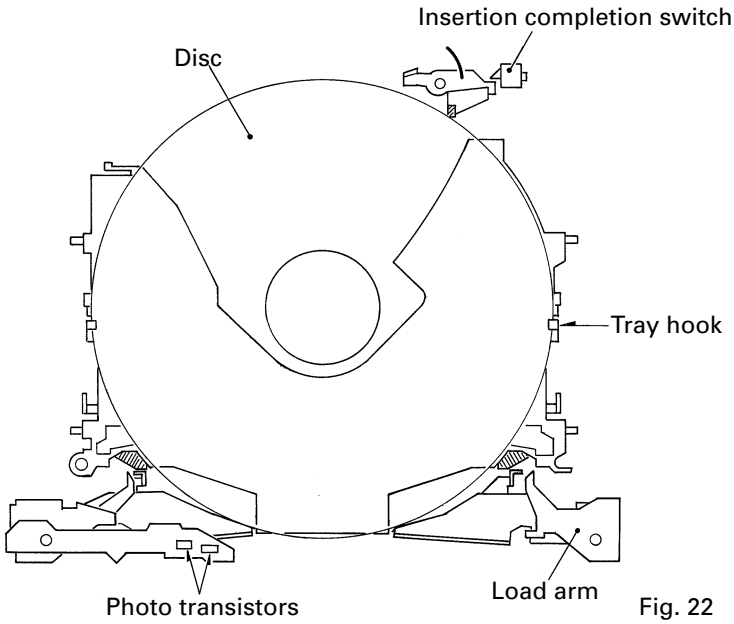


Fig. 22

3.2 Elevation

a)The Cam gear rotates to the elevation OK position.
b)The ELV motor rotates to slide the elevation lever via the gears.
c)The 2 elevation levers (left and right) can synchronize their sliding via the joint arm.
d)The shafts of the Stage Mech Assy engage with the stair-like grooves in the elevation levers and the vertical holes in the Main chassis via the rollers.
e) When the elevation levers slide, the Stage Mech Assy moves up and down.

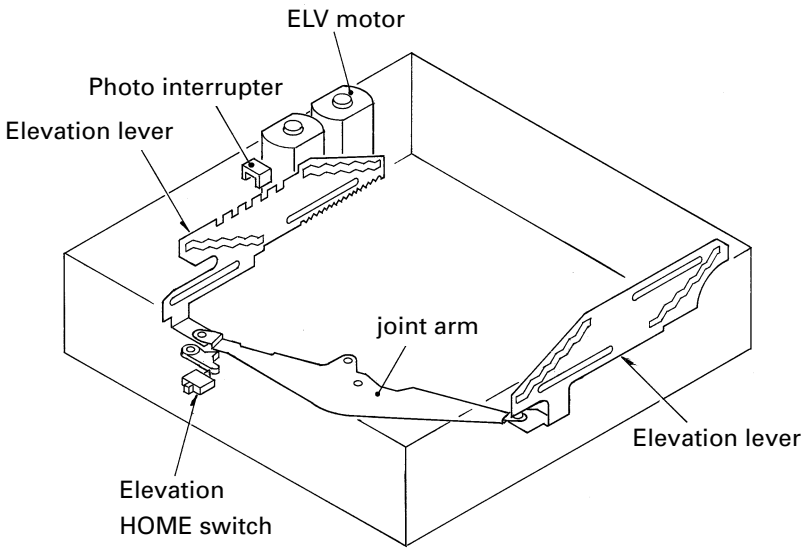


Fig. 23

3.3 Elevation Detection

a)The elevation detection (slit count) is performed by the photo interrupter.
b)After the elevation HOME switch is turned ON, the photo interrupter counts the slits of the elevation levers.
* The bottom position (the 1st stage) is detected when the elevation HOME switch is turned on (not detected by the photo interrupter).

3.4 Disc Clamp

a)The Stage Mech Assy moves up and down to reach the height of the selected tray, using the elevation mechanism.

b)The Cam gear rotates clockwise, the Carriage drive arm rotates, and then the Carriage Mech Assy moves toward the disc via the Carriage drive shaft.

c)The Cam gear continues rotating clockwise and the Carriage drive shaft moves the Clamp UP lever. Then the Clamp arm touching the Clamp UP roller moves down to clamp the disc.

d)The Cam gear stops when the Clamp switch is turned ON.

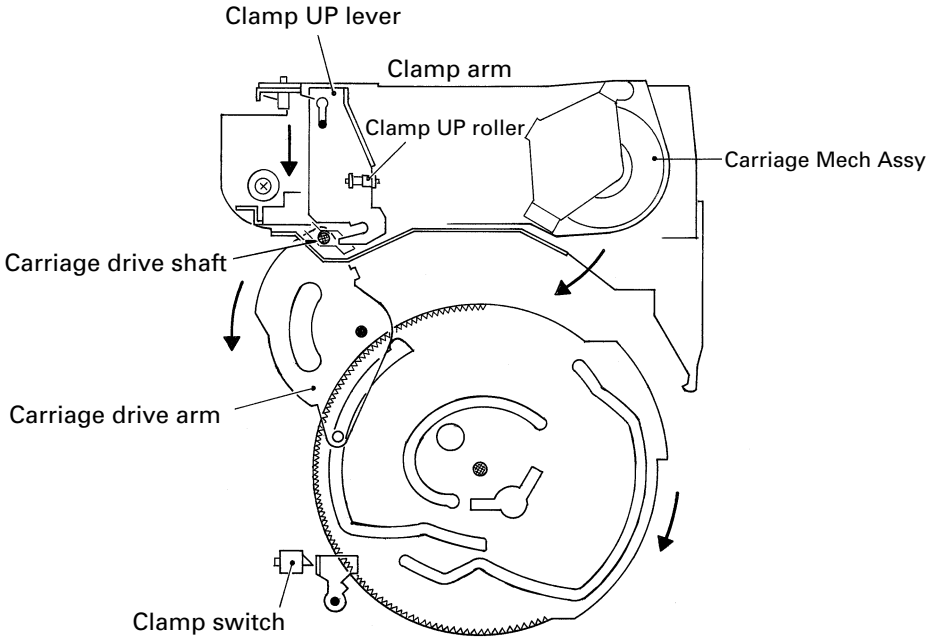


Fig. 24

3.5 Disc Sense (Initializing)

a)The disc sense operation is to detect if or not a disc is loaded on the trays 1 to 6.

b)While a disc is inserted using the robber rollers, the disc pushes the insertion completion switch via the arm to sense that a disc is loaded.

3.6 Disc Ejection

a)The same operations as the steps a) to e) on "3.1 Disc insertion" are performed.

b)The rubber roller(s) rotate(s) in the direction for disc ejection.

c)When the infrared LED light, which has been interrupted by the disc, passes toward the photo transistors, the rubber rollers stops.

3.7 Mechanism Lock

a)Mechanism lock operation is to push the mechanism downward and toward the disc slot in order to keep the mechanism at the correct position during disc insertion/ejection, and to leave the appropriate gap above the mechanism.

b)The Cam gear rotates to move the Mech lock lever toward the rear of the Mechanism. The lever pushes the inside surface of the product. It causes the mechanism to move forward.

c)With the movement of the Mech lock lever, the Mech lock lever (right) moves in a slanting direction as indicated by the arrow in Fig. 25 to push the mechanism forward and downward.

d)The Mech lock lever (left) is driven by the movement of the Mech lock lever via the Mech lock junction lever to push the Mechanism downward.

e)The mechanism lock is released only in the disc clamp mode.

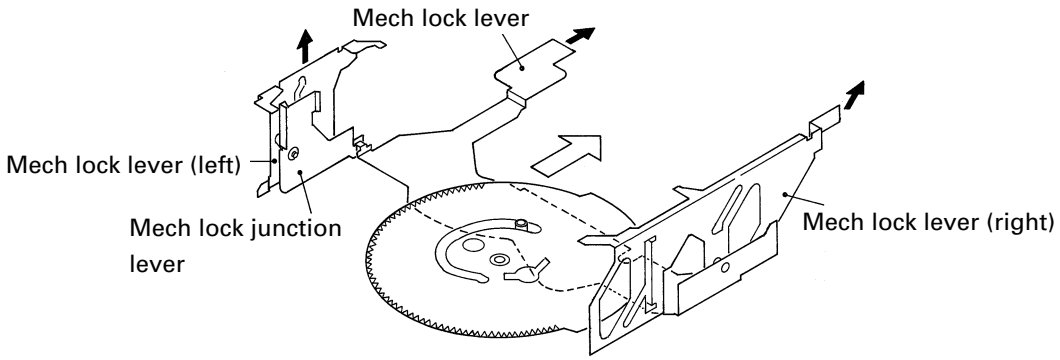


Fig. 25

3.8 Door Open

a)The Door open lever pushes the door on the product grille to open it.

b)The Cam gear rotates to move the door arm. Then, the door arm moves the door lever.

c)The door lever moves the door open lever via the buffer spring.

d)When the door switch is turned ON, the Cam gear motor stops rotating.

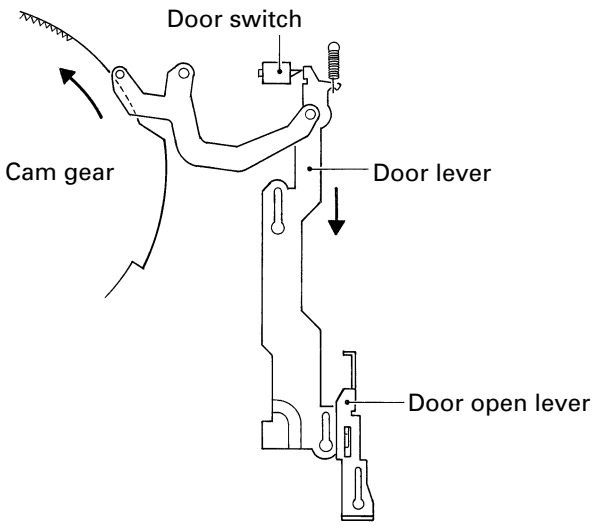


Fig. 26

3.9 Stage Mechanism Lock

a)To prevent the Stage mech assy from rattling during disc play, which may adversely affect the vibration-resistant performance, the Stage lock function works only in the disc clamp mode.

b)In the mode described at the step c) on "3.7 Mechanism lock" , the Stage lock lever (right) is driven by the movement of the Mech lock lever (right).

c)The 2 bent portions of the Stage lock lever (right) are pressed against the gear-like portions of the chassis to lock the right side of the Stage mech assy.

d)For the left side of the Stage mech assy, in the mode described at the step d) on "3.7 Mechanism lock", the Mech lock junction lever is driven to move the Stage lock lever (left).

e)The 2 bent portions of the Stage lock lever (left) are pressed against the gear-like portions of the chassis to lock the left side of the Stage mech assy.

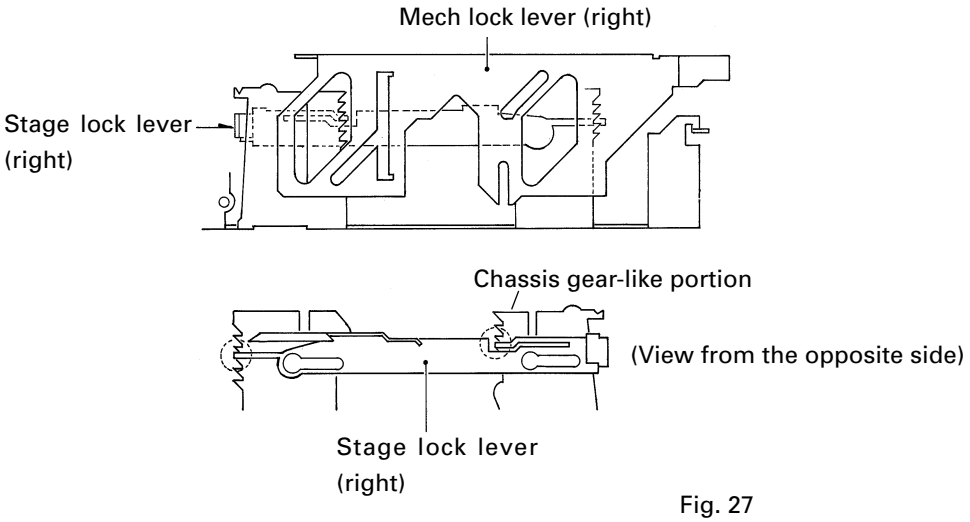

Mech lock lever (right)
Stage lock lever (right)
Chassis gear-like portion
(View from the opposite side)
Stage lock lever (right)

Fig. 27

4. DISASSEMBLY

● How to remove the Tray Assy

1. Apply about 6V current to the Cam gear motor until all holes match at the position (A) (elevation OK position).
2. Hook the three springs B temporarily as shown in Fig. 28. While pushing the Tray holder lock arms (right and left) in the direction (C), remove the Tray holder.
3. Lift up the Tray assy to remove it.

* Be careful not to remove the Tray hooks from the Tray assy.

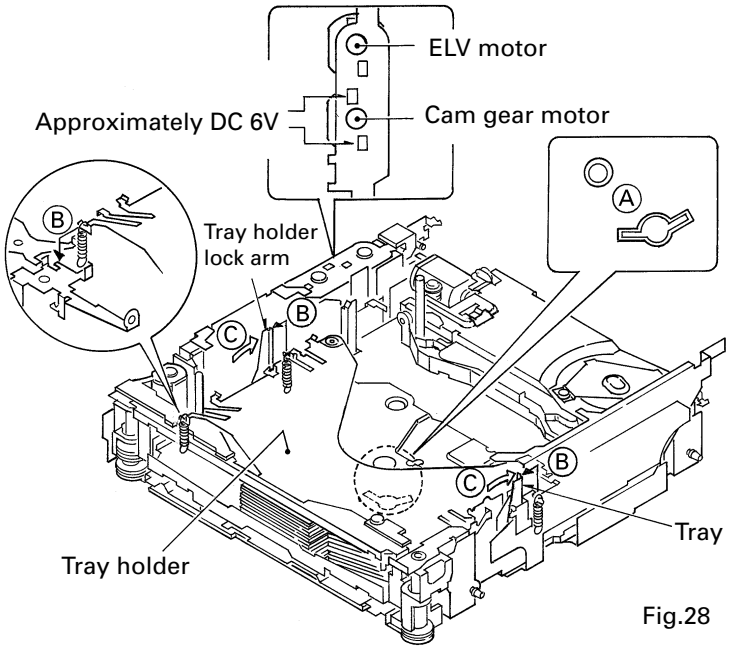


Fig.28

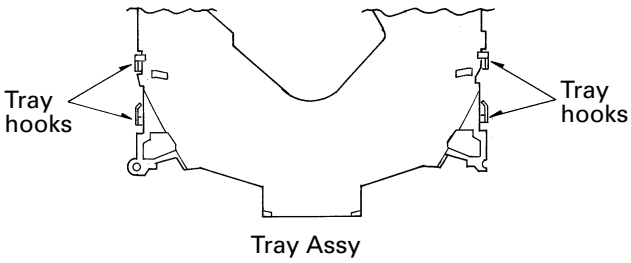


Fig. 29

● How to remove the Carriage Mech Assy

1. Insert a short pin into the flexible PCB of the Pickup unit.
2. While opening the resin hooks, remove the cover from the Servo unit.
3. Disconnect the flexible PCBs from the connectors CN101 and CN301.
4. Remove the Tray holder and the Tray assy. (See above)
5. Rotate the Cam gear motor until the positions of all holes (E) match, then stop the motor.
   (The Carriage Mech assy will stop as shown in the Fig.30.)

* When the positions of all holes match, they will be completely covered by the Carriage mech assy.

* To rotate the Cam Gear motor, see "How to remove the Tray assy".

6. Unhook the spring A.
7. Remove the flexible holder B (while opening the hooks).
8. Remove the flexible PCB (C) from the motor. (The flexible PCB (C) has been stuck on the motor with double-sided adhesive tape.)
9. Loosen the fixing screw and remove the flexible holder.

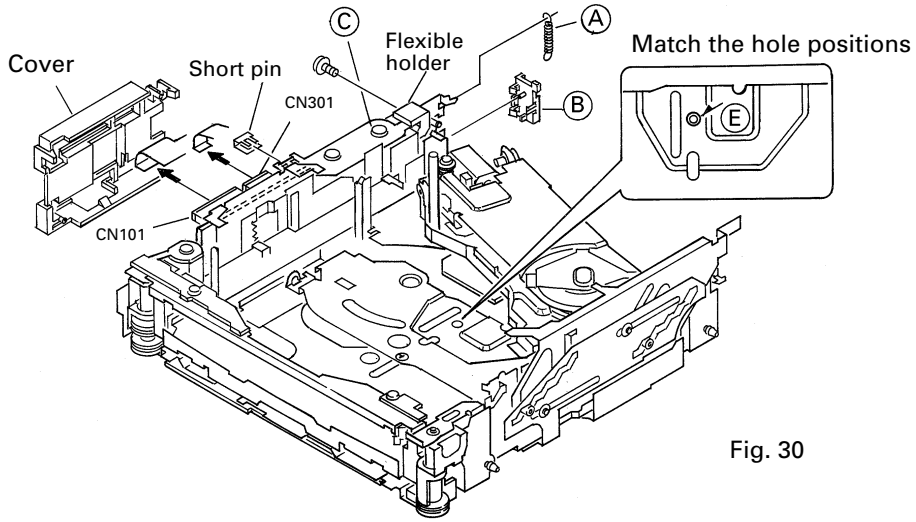


Fig. 30

10. Remove the screw, pressure spring and collar. Lift up the Carriage mech assy to remove it.
    * Screw tightening torque: 2.6kgfcm

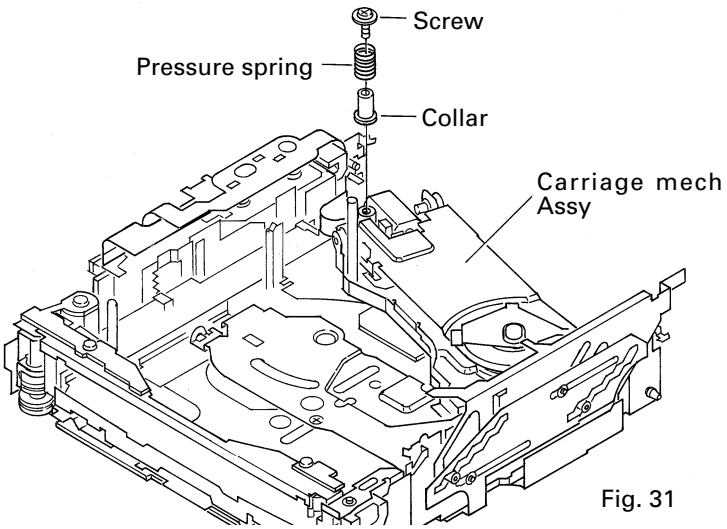


Fig. 31

● How to remove the Pickup unit

1. Remove the pulling spring, torsion spring and E-shaped ring. Then remove the Clamper arm.

* The spring (A) will be removed with the Clamper arm.

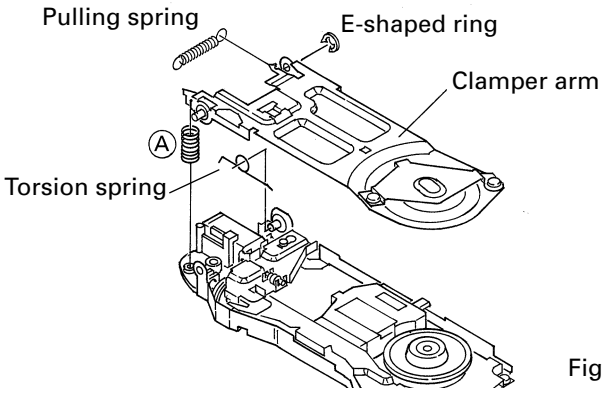


Fig. 32

2. Slide the Clamp UP lever (B) to remove it.
3. Loosen the 2 screws. Remove the feed-screw cover by sliding it.
4. Remove the feed-screw pressure spring (D).
5. Loosen the 2 screws. Remove the feed-screw holder (E).
6. Remove the belt.
7. Remove the Pickup unit together with the feed screw.

* Be careful not to lose the shaft holders at the both ends of the feed screw.

* Be careful not to damage the 2 flexible PCBs(for the Pickup and motor) when separating them. The flexible PCBs have been stuck each other with double-sided adhesive tape.

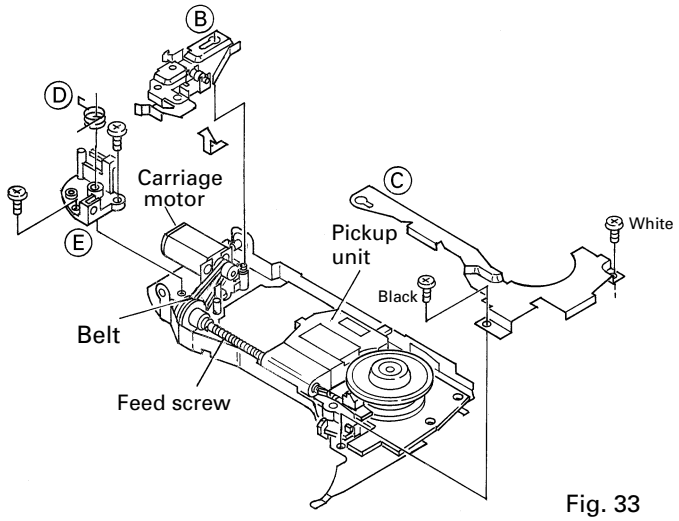


Fig. 33

8. Loosen the 2 screws. Remove the plate spring and the rack.
9. Pull out the feed screw from the Pickup unit.

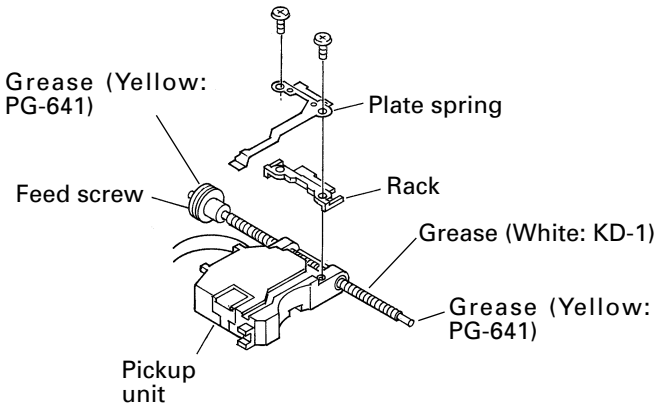


Fig. 34

● How to remove the Carriage Motor Assy

1. Loosen the 2 screws (A). Remove the Carriage motor assy.

● How to remove the Spindle Motor Assy

1. Remove the connector.
2. Loosen the 2 screws (B). Remove the Spindle motor assy.

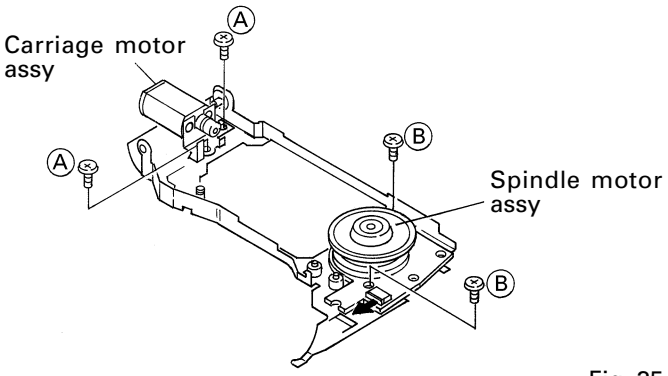


Fig. 35

● How to remove the Cam gear motor and ELV motor

1. Insert a short pin into the Pickup flexible PCB. (See Fig. 30)
   Remove the Cover from the Servo unit. (See Fig. 30)
   Disconnect the flexible PCBs from the connectors CN101 and CN301. (See Fig. 30)
2. Disconnect the the flexible PCB (Motor PCB(A)) from the connector CN201 on the Servo unit.
3. Disconnect the flexible PCB from the connector CN801 on the STS unit.
4. Loosen the 2 screws (A). Remove the Servo unit.
5. Loosen the screw (B). Remove the flexible PCB holder.
6. De-solder at the 4 portions (C). Remove the flexible PCB.

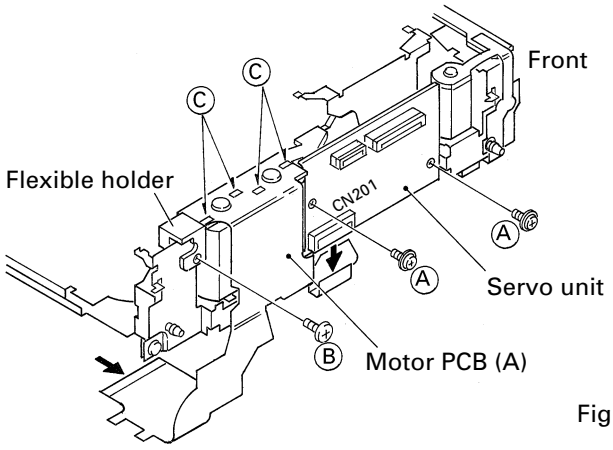


Fig. 36

7. Loosen the 2 screws (D). Remove the Gear cover.
8. Loosen the 3 screws (E). Remove the Motor bracket assy.

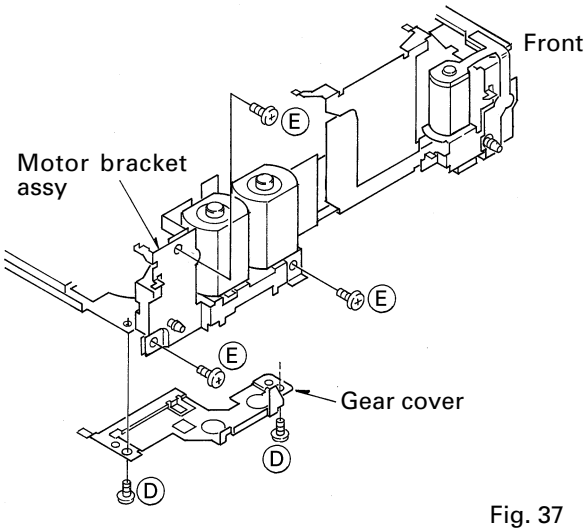


Fig. 37

9. Remove the 5 polyslider washers, then gears and shaft.
10. Loosen the 4 screws. Remove the Cam gear motor and ELV motor.

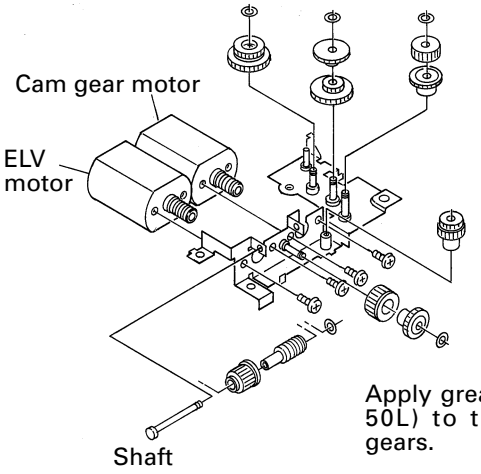


Fig. 38

● How to remove the Loading motor

1. Insert a short pin into the flexible PCB of the Pickup unit.(See Fig. 30)
   Remove the Cover from the Servo unit. (See Fig. 30)
   Disconnect the flexible PCBs from the connectors CN101 and CN301. (See Fig. 30)
   Disconnect the the flexible PCB (Motor PCB (A)) from the connector CN201 on the Servo unit. (See Fig. 36)
2. Unhook the spring. Remove the Door open lever.
3. Loosen the 3 screws. Remove the PCB units (C) & (D) and the frame.
4. Remove the spring (A).

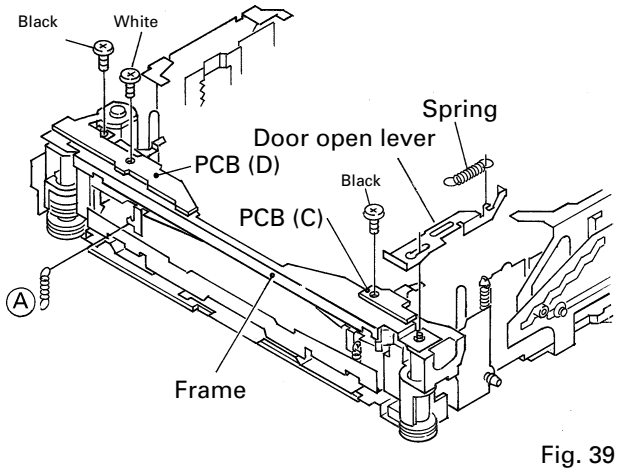


Fig. 39

5. Remove the belt (large).
6. De-solder at the points (B) and (C).
7. Loosen the 2 screws. Remove the Loading motor bracket.
8. Remove the belt (small).
9. Loosen the 2 screws. Remove the Loading motor.

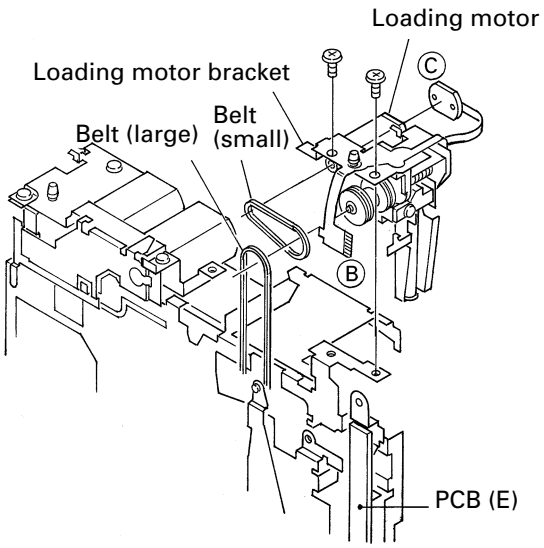


Fig. 40

● How to remove the Stage Mech Assy

1. Remove the Tray holder and the Tray assy. (See Fig. 28)
   Remove the Carriage mech assy. (See Fig. 30 and 31)
   Remove the Servo unit. (See Fig. 36)
   Remove the Motor PCB (A). (See Fig. 36)
   Remove the Gear cover. (Fig. 37)
2. Unhook the Spring (C). Remove the Door-open lever.
3. Loosen the screws (D), (E), and (F). Remove the PCB (C) and (D), and the frame.
4. Unhook the springs (A) and (B).
5. Pull out the Load arm assy (right) upward.
6. Unhook the spring (G). Remove the belt (large).
7. Loosen the screw (H). Remove the Load arm assy

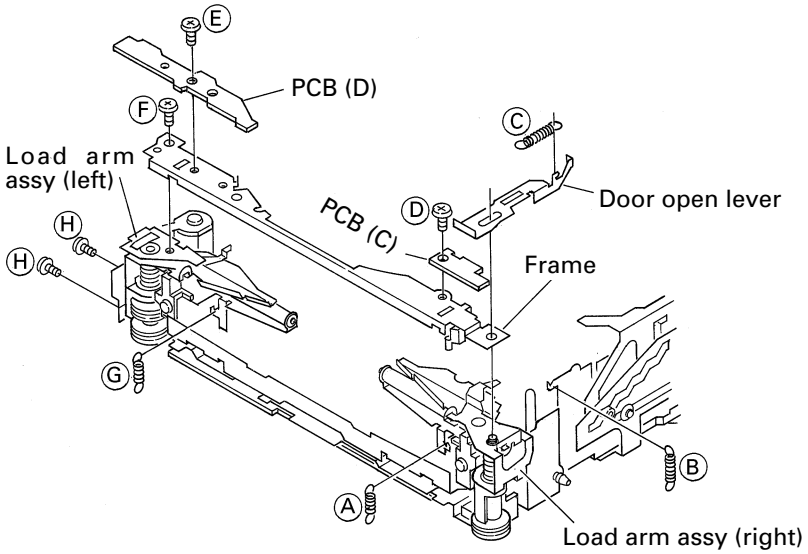


Fig. 41

(left) including the Loading motor.

8. Loosen the 4 screws. Remove the Motor bracket assy and Photo interrupter.

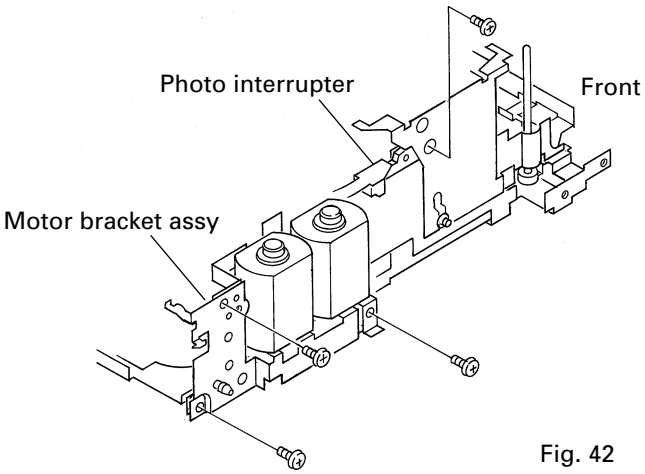


Fig. 42

9. Remove the 4 E-shaped rings (A) and 3 washers (B).
10. Remove the Mech lock lever (left).
11. Remove the 2 rollers (C).
12. Remove the Elevation lever (left). (Pay attention to the mounting direction.)
13. Remove the Mech lock junction lever and and roller (D).

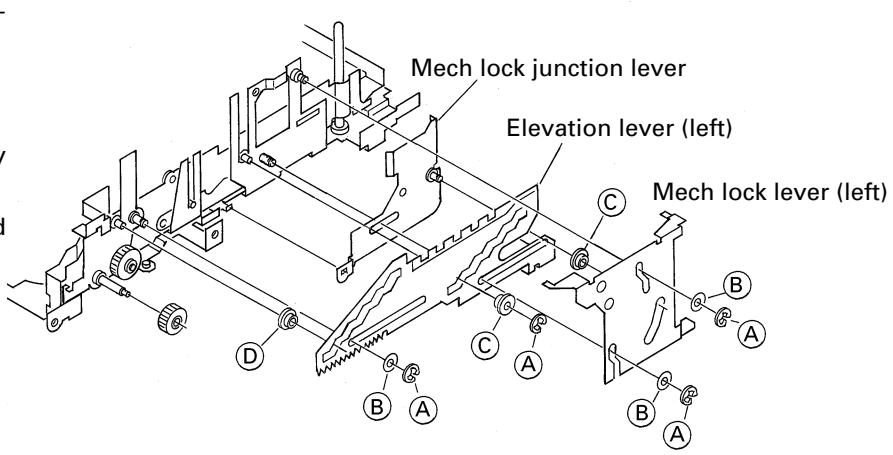


Fig. 43

(Pay attention to the mounting direction.)

14. Remove the 2 E-shaped rings (A) and 2 washers (B).
15. Remove the Elevation lever (right).
16. Remove the 2 rollers (C). (Pay attention to the mounting direction.)
17. Remove the Mech lock lever (right).
18. Lift up the Stage mech assy to remove it.

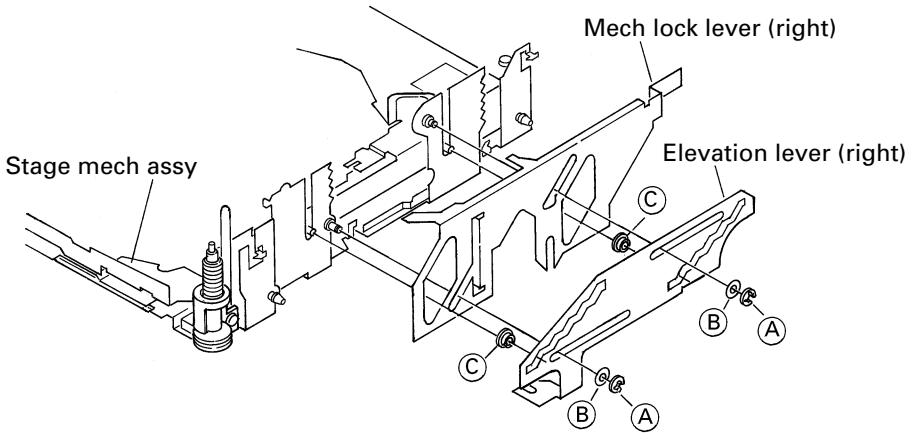


Fig. 44